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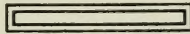
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Feb 9. 1920.

The Canadian Society of Technical Agriculturists



ADDRESSES AND DISCUSSIONS
***** AT THE *****
ORGANIZING CONVENTION
OTTAWA, ONT, JUNE 2, 3 AND 4, 1920

EDITED AND ARRANGED BY THE
GENERAL SECRETARY-TREASURER



PUBLISHED THROUGH THE COURTESY OF
THE INDUSTRIAL AND EDUCATIONAL PUBLISHING COMPANY
GARDENVALE, P.Q.

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ELECTED OFFICERS :

President :

L. S. KLINCK, University of B.C., Vancouver.

First Vice-President :

H. BARTON, Macdonald College, P. Q.

Second Vice-President :

J. N. PONTON, 63 William Street, Montreal, P. Q.

Honorary Secretary-Treasurer :

L. H. NEWMAN, Ottawa, Ont.

The above-named officers, together with one member of each provincial executive, form the Dominion Executive of the Society. Pending the organization of provincial Branches, the following have been elected :—

Alberta :

G. H. CUTLER, University of Alberta, Edmonton.

British Columbia :

A. F. BARSS, University of British Columbia, Vancouver.

Manitoba :

T. J. HARRISON, Agricultural College, Winnipeg.

New Brunswick :

E. P. BRADT, Secretary for Agriculture, Fredericton.

Nova Scotia :

G. E. SANDERS, Annapolis Royal.

Ontario :

G. J. SPENCER, O.A.C., Guelph.

Prince Edward Island :

J. A. CLARK, Experimental Station, Charlottetown.

Quebec :

JULES SIMARD, Post Office Building, Quebec.

Saskatchewan :

W. P. Thompson, University of Saskatchewan, Saskatoon.

General Secretary-Treasurer :

FRED. H. GRINDLEY, Gardenvale, P. Q.

FOREWORD

It is now over six months since the Organizing Convention of the Canadian Society of Technical Agriculturists was held in Ottawa. The delay in printing a report of the proceedings has been a necessary one. The complete manuscript did not reach the General Secretary until July 15th; the material was then forwarded to the various speakers for revision, and on account of delays of one kind and another, was not all returned until September 15th. At that date the finances of the Society would not permit publication. Negotiations had, however, been completed with the Industrial and Educational Publishing Company in regard to the publication of an "official organ" of the Society, and the publishers agreed recently to proceed with the printing of the Convention report without charge.

The report is not a complete one. Considerable discussion, particularly in regard to the Constitution and By-Laws, has been omitted as being unimportant or of little interest at this date. The constitution and by-laws, personnel of committees and resolutions, are also omitted. This information has already been printed in booklet form and mailed to members. Additional copies will be furnished upon request.

The first issue of "Scientific Agriculture," which it is hoped will continue indefinitely to be the official organ of the Canadian Society of Technical Agriculturists, will be published in January next, and monthly thereafter. Its first Editor is the General Secretary of the Society, so that the connection between the C.S.T.A. and the publishers is a very close one. It should be possible to so adjust the two lines of work that the Editor—as Secretary—can obtain full co-operation from the members of the Society, and the Secretary—as Editor—can give to the Society the benefit of publicity channels which are already established.

Steps are now being taken to appoint an Editorial Board, the personnel of which will be made up of two experts in each of the following divisions of agriculture—animal husbandry, bacteriology, botany, cereal husbandry, chemistry, dairying, entomology, genetics, horticulture and veterinary science. Possibly the divisions of rural economics, rural engineering and rural sociology will also be added. The Editorial Board will be a consultative body to whom technical material received for publication can be referred.

Communications in reference to the Canadian Society of Technical Agriculturists or its official organ, should be addressed "Fred H. Grindley, Gardenvale, P. Q."

Canadian Society of Technical Agriculturists

ORGANIZING CONVENTION

Held at

CHATEAU LAURIER, OTTAWA

2nd, 3rd and 4th June, 1920

REPORT OF CHAIRMAN OF ORGANIZING COMMITTEE, MR. M. E. DAVIS.

It is, perhaps, not out of place to advance a few reasons justifying the formation of this society. When one begins to ponder over agricultural conditions in this country and compare them, especially the conditions obtaining in what is known as scientific agriculture, with conditions in like fields of effort in other countries, one is struck with the lack of something in our midst. We have our institutions of agriculture, of which no one need be ashamed; we have our different Government Departments, and a number of scientific workers, as is evidenced by the good work these institutions and these men have given us in the past. There is certainly no lack of ability, but despite the numerous individual examples which might be cited here and there, the student is aware of a certain absence of co-operation of purpose, a lack of definiteness of endeavour, and a need for greater democratic co-operation. These among other things seemed to suggest the need for encouraging the technical branch of our calling to consider and rectify such conditions, if possible.

What has been aimed at in the

organization of this society is a far reaching representative organization of democratic tendencies for the purpose of bringing agricultural scientists of this country into closer touch with each other and with their problems, a society which shall stand for advancement and efficiency, a society which shall be a medium for clarifying our various theories and ideas. We have in our free country the right of public opinion, which may bring moral pressure to bear, without assuming any direct action. It is hoped that this society will be a body not seeking powers of jurisdiction but a body with such a reputation that ideas originating within its folds will carry such force and weight that they will be seriously considered by those who guide our agricultural destinies.

On behalf of the organizing committee I wish to thank you one and all for the support you have given from the very outset. Without the constructive criticism of many, and without the moral and financial support of all of you, it would have been impossible for us to get this gathering together this morning.

REPORT OF THE SECRETARY-TREASURER OF THE ORGANIZING COMMITTEE, FRED. H. GRINDLEY.

At a re-union of Macdonald College graduates in August, 1919, considerable discussion took place regarding the advisability of organizing a Society which would include in its membership all those who were engaged in scientific and administrative agricultural work in Canada, or whose duties were along lines of agricultural research, extension work, experimental problems, etc. No definite policy or aims were outlined in detail at that time, but it was plainly felt that there should be in Canada some organized body which would represent the technically trained agriculturist in just the same way that other scientists are represented in various institutions and societies.

A committee of five was therefore appointed and asked to proceed with organization work. In order to facilitate the holding of meetings and to centralize the work of organization, the members appointed were all residents of Ottawa. They were F. E. Buck, M. B. Davis, F. L. Drayton, F. H. Grindley and G. LeLacheur.

This Organizing Committee held its first meeting at 110 Gloucester Street, Ottawa, on the evening of Friday, October 10th, 1919. A tentative name for the Society—The Canadian Society of Technical Agriculturists—was adopted. Mr. M. B. Davis was appointed Chairman of the Committee, and Mr. Fred. H. Grindley, Secretary-Treasurer.

Active organization work commenced at once. The Committee obtained the Constitution, by-laws, history, etc., of as many similar societies as possible, and proceeded to prepare a complete list, or as complete a list as possible, of eligible members in Canada. The latter was compiled from the various lists of agricultural gradu-

ating classes, the staffs of all agricultural colleges, and the employees of the Federal and Provincial Departments of Agriculture. Approximately nine hundred names were obtained in this way during the next six weeks, and a card index system was adopted to indicate the duties, titles, degrees, office and home addresses of these eligibles. During this time considerable publicity was given to the work of organization through the agricultural press, in order that prospective members might be prepared to receive propaganda material. Preliminary work in preparing a tentative Constitution and by-laws, aims and objects, etc., was also completed, and expressions of opinion regarding the general need for such an organization, were obtained from leading agriculturists in various parts of Canada.

On January 9, 1920—nearly five months ago—a campaign for members was launched, and the first circular was sent out to the complete list of eligibles. With this circular was included a membership application form. It should be stated that the Committee, in order that it might not assume too great responsibility in the matter of accepting applications, had so worded the eligibility requirements that any who were not graduates of a University or Agricultural College, could only be accepted provisionally and their applications referred to the permanent Dominion Executive when such was appointed. It was clearly pointed out, too, that the objects, aims, constitution, etc., as published, were entirely tentative and subject to subsequent amendment and revision.

The response to this circular was, on the whole, very gratifying. Seventy-seven members had join-

ed on January 31st, or within three weeks after the campaign was launched. In a report of this nature, which is to be of permanent record, it should be noted that the first application for membership accepted by the Organizing Committee, was that of the late Dr. Gordon Hewitt, dated January 14, 1920. Dr. Hewitt showed the keenest interest in the organization of this society from the beginning, and his death on February 29, was not only an irreparable loss to Canadian agriculture in its present stage of development, but also deprived many of his personal friends of his valued counsel and advice.

At this stage of the organization work it became obvious that best results could be obtained by the appointment of Provincial or District committees which could approach the eligible members at closer range. Particular acknowledgment is due to those in the various Provinces who gave to the Organizing Committee such splendid co-operation and support at that time and since. Without these committees the organization work could not have been completed as rapidly and as thoroughly as it has been. The Provincial and District Committees, as appointed in February last have remained practically unchanged, and are as follows:—

British Columbia—Chairman: L. S. Klinck; Representative: R. C. Treherne.

Prairie Provinces—Chairman: E. A. Howes; Representatives: G. H. Cutler, for Alberta; A. M. Shaw, for Saskatchewan; F. W. Broderick and T. J. Harrison, for Manitoba.

Ontario—Chairman: G. A. Putnam; Representatives: G. J. Spencer, R. S. Duncan, L. H. Newman.

Quebec.—Chairman, H. Barton; Representatives: L. C. Raymond, Jules Simard.

Nova Scotia.—Representative: C. A. Good.

New Brunswick.—Representative: E. P. Bradt.

Prince Edward Island.—Representative: J. A. Clark.

During the month of February only forty-three applications were received, bringing the total to one hundred and twenty on February 29th. During that month, however, the Committee had given much thought to Provincial organization work and publicity, and was prepared to launch, with the assistance of its committees, an energetic campaign which would be continuous until the time of the Convention.

Circular No. 2 was mailed to eligibles early in March and Circular No. 3 on April 7th. In the former a plebiscite was taken on the name of the Society and the date and place of the Convention. The returns indicated a strong preference for the present name of the Society, and for holding the first Convention in Ottawa during the month of June. In Circular No. 3 the Committee asked for nominations for the offices of President, Vice-President and Honorary Secretary-Treasurer.

As a result of these two circulars, fifty-four new applications were received during March and one hundred and thirty-seven during April, raising the total membership to one hundred and seventy-four on March 31st and to three hundred and eleven on April 30th.

A tentative programme for the Convention was arranged during March and was submitted to the district committees for criticism. This resulted in some revision and it was not until the middle of April that invitations were sent to the various suggested speakers. The manner in which these men, almost without exception, expressed their willingness to attend the Convention, and the interest which they

have shown, are particularly to be commended.

It was at this time—the middle of April—that the Committee decided to approach the Minister of Agriculture and ask for financial assistance to cover part of the organization and convention expenses. Mr. Putnam and Mr. Newman, of the Ontario Committee, Mr. L. C. Raymond, of the Quebec Committee, Dr. J. H. Grisdale, and three members of the Central Organizing Committee, interviewed the Hon. Dr. Tolmie on April 20th, and asked for a Government grant of two thousand five hundred dollars. The deputation was most favourably received and at the request of the Minister, a memorandum was subsequently submitted which outlined in some detail the main purposes of the Society, the needs for same and the reasons for seeking Government assistance. At the time of writing this report, no statement has been received from the Government in regard to the request.

Following the receipt of nominations for the principal offices and after obtaining from the nominees an expression of their willingness to stand for election, the co-operation of the Proportional Representation Society of Canada was obtained and Mr. Ronald Hooper, Honorary Secretary of that Society, agreed to receive, open and supervise the counting of the election ballots. These were mailed to members with our Circular No. 4 on April 27 and the returns counted on the evening of May 13th. The elected officers, as announced through the Associated Press and in Circular No. 5 of the Committee, were as follows:—

President:—L. S. Klinck.

Vice-President:—H. Barton.

Hon. Secretary-Treasurer:—L. H. Newman.

Concurrent with the election, official delegates to the Conven-

tion were being appointed by the members in the various Provinces, through the District Committees. It was decided that one delegate should be elected for every ten members in each Province, that full voting privileges should be vested in these men at the Convention, and that their travelling expenses to and from Ottawa should be refunded. Those appointed were as follows:—

Alberta: E. A. Howes and T. O. Clark.

British Columbia: A. F. Barss, P. A. Boving, H. M. King and G. G. Moe.

Manitoba: T. J. Harrison and J. B. Reynolds.

New Brunswick: E. P. Bradt and A. C. McCulloch.

Nova Scotia: L. A. De Wolfe and Geo. E. Sanders.

Ontario: F. E. Buck, J. A. Carroll, G. H. Clark, J. W. Crow, R. S. Duncan, F. H. Grindley, J. E. Howitt, R. Innes, W. R. Leslie, A. P. MacVannel, J. R. Miller, L. H. Newman, E. F. Palmer, W. R. Reek and J. M. Swaine.

Prince Edward Island: Frank Tinney.

Quebec: H. Barton, F. Letourneau, J. N. Ponton, A. Raymond, L. C. Raymond, A. Savage, F. N. Savoie, Jules Simard and R. Summerby.

Saskatchewan: J. T. Bridge and A. M. Shaw.

Circular No. 5, including the results of the election and the revised programme, was mailed to members on May 15th. It was also sent to non-members with a covering letter urging them to send in their applications for membership before the Convention was held.

During the latter part of May the Committee completed the preparation of Circular No. 6, including the tentative Constitution and List of Members to be distributed on the opening day of the Convention; a tentative set of by-laws

was also prepared, to be used as a basis for discussion on the second day of the Convention. It was also necessary, during the latter part of May, to give much attention to the arrangement of Convention details.

Reviewing the work of the past eight months, the Committee feels that the results obtained have been eminently satisfactory. Some difficulties had to be met, but these proved to be minor and temporary. Keen interest and encouragement by the members convinced the Committee that the need for such a Society was widely felt, and the frank expressions of opinion and many constructive criticisms which have been submitted, have been of the greatest possible help.

During the month of May one hundred and sixteen applications were received, and the total membership on May 31st had reached four hundred and twenty-seven, which is approximately fifty per cent of those eligible in Canada. Of the total membership 403 are graduates of Universities or Agricultural Colleges and twenty-four are not graduates; the applications of the latter have yet to be considered by the elected Executive Committee. The distribution of the members by Provinces is as follows: Alberta, 22; British Columbia, 42; Manitoba, 25; New Brunswick, 19; Nova Scotia, 18; Ontario, 164; Prince Edward Island, 15; Quebec, 98; Saskatchewan, 19; and the United States, 5.

A Financial Statement showing the receipts and expenditures of the Organizing Committee up to May 31st, is appended to this report.

There have been thirty-one meetings of the Organizing Committee since its first meeting on October 10th last. Minutes of these meetings, files of correspondence, ballots from plebiscite and election, cash books, accounts rendered, applications for member-

ship and all other material of interest, are in the hands of the Organizing Secretary-Treasurer.

FINANCIAL STATEMENT

Covering period from Nov. 1st, 1919 to May 31, 1920.

RECEIPTS:

Loan from Macdonald College Alumni Assn.	\$ 50.00
Paid membership fees—	
427 at \$5.00	2,135.00
Donation from Dr. Jas. Mills	5.00
Membership fees outstanding (1)	5.00
Total receipts	\$2,195.00

EXPENDITURES:

Addressing envelopes . .	\$ 28.00
Exchange on cheques . .	3.35
Office Supplies	13.40
Postage	90.00
Printing to May 31st . .	432.07
Stenography	20.00
Telephones	5.75
Telegrams	52.88
Travelling expenses (Members of Com.) . .	17.65
	\$663.10

Convention incidentals, cash retained by Organizing Committee—disposal to be submitted after Convention	\$ 100.00
Due from members . .	5.00
Balance in bank	1,426.90
	\$2,195.00

Upon motion by Mr. Grindley, seconded by Mr. G. H. Clark, the foregoing report was adopted.

The Chairman:* By the adoption of this report your provisionally elected representatives for the positions of President, Vice-

*President L. S. Klinec presided at all meetings unless it is otherwise indicated.

President and Honorary Secretary-Treasurer, automatically become elected to the positions referred to in the Report just presented.

Permit me to express my deep appreciation of the very great honor you have conferred upon me in electing me president of the Canadian Society of Technical Agriculturists. The responsibility devolving upon the first incumbent of this position is very great; but when one considers the personnel of the other elected members of the Executive, and the excellent preliminary work which has been done by the Organizing Committee, you will agree that everything has been done to make the task of your president as light as possible.

While all this is very gratifying I am still at a loss to know why you have done me this honor. The only explanation I have been able to give is based on the old saying, that "far away hills look green." Having mistaken appearances for realities, and having assumed that if hills are green, mountains must be greener you have taken a sporting chance and selected as your chief executive officer, a man who resides where the base of the most westerly Coast Range is washed by the tides of the Pacific.

Technical agriculturists in Canada have been slow to organize. As professor Barton has said:

"The technical men in agriculture have been so busy organizing others that they have not had time to organize themselves." Unquestionably there is need for the creation of a society such as that just outlined by the Chairman and Secretary of the organizing committee. The far-reaching forward movements now taking place in agriculture have had no little influence in hastening the formation of this Society.

In agriculture, as in other industries, some organizations are perfected for offensive movements, others for defensive movements; some exist primarily for the benefit of members of the Association, others have regard only for the advancement of the industry as a whole. The course which this Society is to pursue will not always be easily determined, but if it attracts and holds in its membership men actuated by but one controlling motive—the advancement of agriculture in the broadest acceptance of that term,—it will perform a public service which will early justify its existence, and which with the passing of the years, will continue to grow in influence and power.

Again I thank you for the honor you have done me, and assure you that I shall do my utmost, whether in office or in the ranks, to advance the best interests of the Society.

REPORTS OF PROVINCIAL ORGANIZING COMMITTEES.

ALBERTA, by Dean Howes.—Upon receipt of a request from the Secretary of the Central Organizing Committee that I act as Chairman for the Prairie Provinces during the period of organization, I thought it best to consult with representatives of each of the Provinces. Professor Cutler of

our own institution had been named as Alberta's representative so that consultation with him was comparatively easy. I went to Saskatoon where I had the opportunity of discussing the question of organization with Dean Rutherford, Professor Shaw and Professor Tisdale. From there I

went to Winnipeg where I met President Reynolds and Professor Brodrick. Professor Harrison at that time had not been named as Manitoba representative on the Committee. I found all of the men I met sympathetic toward this movement for organization among technical agriculturists.

We were all a little anxious to know just what the attitude of some of the older and more experienced men in the agricultural field would be toward this work. To clear the matter up we wrote to the Secretary of the Organizing Committee, to the Dominion Seed Commissioner, the Dominion Horticulturist and the Dominion Cerealists, asking in plain English for a verdict in connection with this new movement. The response was very cordial indeed and gave us encouragement to go ahead. I might mention that I also had the privilege of two conversations with the Deputy Minister of Agriculture and I need hardly say that his opinion and encouragement went a long way with us.

It will be noticed that the membership in the Prairie Provinces is comparatively light. I might offer as an explanation that unless you have lived or travelled much in these Provinces you cannot realize the difficulty of getting in personal touch with many men in a reasonable amount of time. The other explanation is that we deemed it best to go slow and wait until after the first Organizing Convention before making a direct drive to secure members. Many of these men in the West have been for sometime out of touch with work such as we propose, many of them have started work of their own in a new country and presumably will be reluctant to become merely a part of a bigger institution, but if we take our time there is no doubt that we will get almost all of those eligible for enrolment.

We have in the West, as I presume you have in the East, a fair number of those who rather keep on the fence at the inception of any work like this, who — to use a homely familiar expression — “will watch to see which way the cat will jump”. That is why we are postponing any attempt to urge these people but rather hope to see them come in of their own free will.

I may conclude by saying that we in the West welcome this movement if for only one reason, that it will tend to unify and standardize effort and to guarantee the integrity of research work, which latter is no small matter of anxiety in a comparatively new country of such wide area.

BRITISH COLUMBIA, By Mr. G. G. MOE: In British Columbia, we have been very fortunate in securing support from men in the Province. At the present time our membership is 42; the number of eligible men according to the requirements is 73, so you see that most of the men have joined up with the Society, and I can speak with assurance that with very few exceptions, they will all become members.

ONTARIO, By Mr. G. A. PUTNAM: We feel that the Organizing Committee being in Ontario and doing such good work, there has been no necessity for our Committee to take any definite aggressive action. We have in Ontario organized in the east, west and centre, and I know from inquiry that you will have a very good representation from Ontario. Personally I was not in a very strong position to make a real effective appeal to some men who will, I am sure, later on join this organization. After this meeting we will be in a position to go back home and make a very effective appeal. I believe we will get the

agricultural college graduates and others who should belong to this organization to join up.

QUEBEC, By Prof. H. BARTON: The duties of the committee in Quebec are very simple indeed. In fact a good part of the work was done before the committee was

formed. A special committee was formed with the specific idea of organizing a French speaking branch and I want to pay special tribute to the work of that committee. Our Province is easy to work. There are 98 members from Quebec, and 55 of the members are French speaking.

THE GOVERNOR-GENERAL'S ADDRESS

The Chairman :—

Rarely indeed is a Society honored as is the Canadian Society of Technical Agriculturists this evening in having as their guest His Excellency The Governor General of Canada. Into the many aspects of the Society's activities His Excellency has entered with keen, sympathetic interest. With an extended experience in practical agriculture in the Motherland, a comprehensive knowledge of the scientific principles underlying the industry, and a matured judgment with respect to the larger matters pertaining to agricultural education, our guest is peculiarly qualified to address this Society which has just been organized to promote the practical, scientific and educational efficiency of Canada's basic industry.

In the proceedings of the Royal Society of Canada our guest has always manifested the deepest interest; and in the larger field of education he continues to render signal service, not only in this country but in the Old Land, where as Chancellor of the University of Leeds, he gives generously of his time and of his ripe experience to furthering the cause of higher education. It affords me the greatest pleasure, therefore, to ask His Excellency to address the members of the Dominion's youngest Technical Society.

His Excellency, The Duke of Devonshire, Governor-General of Canada.

Mr. Chairman and Gentlemen:

You, Sir, remind me that I have taken considerable interest in the work of agriculture, and you also remind this audience that I take considerable interest in the work of the Royal Society of Canada. I think it is a happy omen that only a few weeks ago, in this very room, I had the pleasure of addressing a number of gentlemen connected with the Royal Society in Canada, and it is extremely satisfactory to note the keenness and wholehearted desire which there is throughout the whole Dominion of Canada to make the very best use we can of the practical application of science to the needs and requirements of the country as we know it.

You are indeed to be congratulated on the very successful inauguration of this movement of which we see the efforts today. The work you are doing, I know, will be of very material assistance not only in the solution of those problems which may confront us from day to day, but it will also open up those avenues which future generations will be able to still further develop. It may be of interest to know that in the Old Country, from which I returned about three weeks ago, conditions are

distinctly favorable, and great and keen as the interest has been in agriculture, it is safe to say that it never was on a sounder basis than it is in that country today. The forthcoming meeting of the Royal Agricultural Society which is to be held at Darlington in a few weeks' time, promises to be one of the most successful in the annals of that society, both in the quality and the quantity of interest; they expect to have almost a record show. I am quite well assured that in spite of the many difficulties and drawbacks which we had to contend with in consequence of war conditions, that never has British stock been in such condition as it is today. It reflects the greatest credit on all concerned, that even in these very difficult and trying times, although possibly the numbers may have diminished, the quality has not.

It might be useful for us to remember that in connection with an organization such as you are engaged in here today, the motto of the Royal Agricultural Society is "Practice of Science", and the foundation which they laid between 70 and 80 years ago has been followed, and that society is doing more extensive work every year than it did before.

We have in this Dominion vast opportunities, and we have seen by practical results what has been achieved by the application of scientific methods and the study of scientific processes, to the natural qualities of the soil and the climate, and we have seen the very remarkable results which have been attained in a comparatively short time. It is a great satisfaction to all of us who are engaged in agri-

culture that there will always be necessarily the need and desire for what we are capable of producing. After all, agriculture is the first necessity of human existence, either in food or in clothing, and it is for us to see that the very best which we can produce shall be produced.

Today we are confronted with a problem of an infinitely more varied and far-reaching character than ever confronted us before. In the very interesting agenda paper which I read, I see you are going to discuss a vast number of very varied subjects. The work which you are doing will, I know, be of great benefit. We have to remember at this moment that in consequence of the war, a considerable area of the world which used to produce food products is incapable of doing so, and it is bound to be a good many years before that production can be raised to anything like pre-war standards. We in Canada, I believe, are in a position to take the fullest advantage of that world-wide condition and by steadily keeping the great object in view, and by keeping science and practice closely hand-in-hand, I am quite confident the Dominion will achieve greater results than ever before.

I can assure you it is a very great pleasure for me to be able to say a few words tonight and to congratulate you most sincerely on the formation of this organization. I wish it every success. I know you will contribute not only to the sum of knowledge in the immediate future, but many generations will be grateful for the work you are doing. I again congratulate you on the work you have achieved.

ADDRESS OF WELCOME BY HON. S. F. TOLMIE, MINISTER OF AGRICULTURE.

Mr. Chairman and Gentlemen : I can assure you that I am very glad to be with you on this very important occasion. It is important because I look for this Association to render very valuable service to the agriculture of Canada. This is distinctly a new and progressive move for higher and better farming.



I want to congratulate the organizing Committee for the splendid work that they have done in getting you together, and I want to congratulate you on the very excellent turnout.

This Society should throw new vim and zest into your work on account of its distinctiveness from anything that has been done in the past. It will afford you an excellent opportunity of getting better agricultural organizations, bringing the best men in agriculture close together so that you can exchange ideas, and in that way benefit each other in the great work in which you are engaged. I think there is no question at all that agriculture today, even under ordinary conditions and more particularly under the conditions in which we find ourselves after the war, is the most important industry that we have in the Dominion of Canada.

There is a tremendous need for agricultural education throughout

our country; education is necessary to the farmer if we are going to obtain good results. and the necessity for education does not end with the farmer. There is a great lack of understanding between the city man and the country man. If the man in the city hears of a man in the country getting 75c a dozen for eggs, he immediately begins to think about profiteering, and on the other hand if the farmer hears of someone in the city doing well, he thinks he is a profiteer. There is great room for a better understanding between the city man and the country man and for better co-operation.

We find in our travels among the farmers that they are not obtaining the best results in carrying on their daily work. In many cases this is due to lack of education and to the fact that they do not take advantage of the very excellent opportunities that they have for making progress. What we need in this country is briefly, better farming, better farming methods, better live stock, the use of better seeds and better cultivation.

In an address I made the other day in the House of Commons in connection with bringing down the estimates of the Department, I stated that, calculating on very conservative lines, and after consulting some of our best experts in the Department, it was estimated that by better methods of farming and by keeping better live stock, and figuring only on the live stock which we have on hand now and the land that is under cultivation at the present time, and without turning over a single acre of new land, we could increase our income from agriculture by a sum something like \$511,000,000.00 a year, or more than one quarter of our present

public debt. I ask the question, is it worth while to worry about trying to attain these results? We are very much impressed with the appalling loss that we suffer in this country as a result of poor methods and poor livestock. We have for years and years been telling the people about the good results that can be obtained by using only pure bred sires. The agricultural press has been doing excellent work along the same line, our Agricultural Colleges have been sending out young men trying to educate the farmers in this regard, and our Experimental Farms have been trying to demonstrate the benefit of improved stock. After all this work, we still have in some of our older Provinces a very large percentage of scrub sires. This is very astonishing to a man coming from British Columbia.

I remember when we had our first herd of pure bred Shorthorn cattle in British Columbia away back in the seventies. The first pure bred bull we ever got came from the East, and it had to be shipped all the way over the Union Pacific Railway to San Francisco, and then 800 miles by boat to get into our country. After a while things began to open up, and we began to get a number of good progressive people from the East. In this way we gradually began to look on the East as a great source of improvement and progress. After all that, it is astonishing to come here and find out, after all these years from 1870 up to the present time, that there is still a very large percentage of scrub bulls in this advanced Province of Ontario, which is certainly one of the best Provinces in the whole Dominion of Canada.

Last December after returning from the big Exhibition in Chicago, I had an opportunity of going through one of the Toronto packing houses. They were put-

ting through on that particular day something like 700 head of cattle. The carcasses were in very thin condition, and I found that they were only weighing from 250 to 350 pounds apiece, just the frame, not very much meat, and what meat there was, of a very poor quality. I asked to see some of these cattle, and I went to the stockyard. I did not find old dairy cows that were going down the last trail, but I found scrub cattle in very poor condition. There is no doubt that, in some measure, this was due to lack of feed and to the agricultural conditions existing last summer, but a great many of these animals could have been turned off two months earlier when they were in better condition, and instead of selling for $5\frac{1}{4}c.$, they would have sold for 8c. and 10c. This was only in one abbatoir. In passing through the coolers, we found the beef was hung up according to its grade, and it showed the great opportunity there was for improvement in this regard.

What wonderful opportunities there are for the use of better seed! Hundreds and thousands of farmers in this country are perfectly willing to plant poor samples of seed rather than take the trouble to secure good seed. There is too much land in this country planted with poor seed. Then in the matter of cultivation, how many hired men do you have to watch to see that your land is properly harrowed, and how many times do you have to send them back to give it another harrowing! I do not know what your experience is in Ontario, but if it is anything like our experience in British Columbia, you cannot afford to keep your eye off the gun for one minute.

Education is accomplishing great things for agriculture in this country. Take the case of the bacon hog. When we first began

to get interested in the British market, we had hogs of a non-descript variety; there was no uniformity about them. A campaign was commenced for the production of the bacon hog, and we have among us today a number of men who took a very active part in that campaign and who rendered very valuable service to this country. We find today that no less than 85 per cent of the hogs passing through the packing houses of this country are of the bacon type. That is worth millions of dollars because it puts us in a position where we are able to compete with the best bacon countries in the world, such as Denmark and Ireland.

We had in British Columbia last year a cow that completed her yearly record of 32,000 pounds of milk, and the average cow of Canada produces a little less than 4,000 pounds. This cow produced just as much as eight scrub cows would produce; she required only one-eighth of the room in the stable, just about one-eighth of the care, she would eat perhaps a little more than one-eighth of what the scrub cows would eat, but she yielded her owner a very large profit, not only in the milk she produced but also in the calf that sold for \$1,000. At ten years of age she was sold to a gentleman in Pennsylvania for \$15,000, along with her heifer calf.

I was asked in the House the other day if I proposed that every man should have a cow like that, and I gave my opinion that he should. He wanted to know if there would be a market for them, and I said, "Certainly; any time a man comes all the way from Pennsylvania to British Columbia to pay \$15,000 for a ten year old cow and a little heifer calf, there is certainly a great demand for them." Some one might say, "This is a rich man's cow". It was bred by Powell of Syracuse,

N. Y., and was sold for \$150 and came to Canada. If an ordinary farmer had bought that cow, one of the kind that would not visit the experimental farm or attend a Farmers' Institute meeting or take any interest in the Agricultural Colleges, he would probably have thought, on account of her pedigree, that she ought to be able to get along with less feed than the ordinary cow; he would probably have tried to winter her on the sunny side of a straw stack; he would give her a balanced ration largely composed of straw and oxygen, and he would try to keep her on a sheep pasture in the summer time. If that had been the care given, she would still have been a \$150 cow, but fortunately she fell into the hands of progressive people who took the best out of her, and I think you will agree with me that that knowledge and that education and that great factor of knowing how to take care of this particular cow was worth \$14,000 to this country.

It is only a short time ago that many of our pure bred stock breeders lost cows year in and year out, and we have lost them on our own farm in the West on account of sterility. We could not do anything for them. A discovery has, however, recently been made, largely due to Dr. Williams of Cornell University, with the result that these animals can now be made useful animals. One veterinary surgeon, who took his original lessons from Dr. Williams, treated 146 head of pure bred cows, and saved something like 76 per cent. The estimated value of these animals was \$75,000, and that is the result of three or four months' work. If that knowledge had not been possessed, these animals would have passed on to the abattoir, and many of them were highly bred animals.

Our Agricultural Colleges have

been rendering splendid services throughout this country, and our Experimental Farms have been doing wonderful work, but still we have been severely criticized, and a great many people have gone so far as to expect that the Experimental Farms should yield a nice profit at the end of the year. If they would look into the question for a moment, they would find that that was a very unreasonable request, because it is often necessary on these farms to do the work on only one-fortieth of an acre, and that kind of work cannot be done by machinery. When an experiment has been tried out one year, the results are not given to the public, but it is tried for several years until it is proven satisfactory and then the results are given to the public.

Take the discovery of Marquis Wheat; if we had only done that and then stopped, I claim the Experimental Farms of Canada have yielded a splendid profit. I do not say they are perfect; there is plenty of room for improvement, and I think there is room for improvement in some other departments as well. We estimate that the value of the Experimental Farms to this country annually is no less than \$60,000,000. Take a man settling in Alberta or British Columbia who comes from Prince Edward Island or Nova Scotia or Ontario or Quebec. He can visit one of our Experimental Farms or write to them and he can get immediately the very best kind of information as to the best seed to use in his particular district, the best method of cultivation, the proper time to sow, and many other things that will be of tremendous advantage to him. Contrast that with the man who goes out and has to depend on his own resources, and who wastes several years of his life trying to find out for himself. It would be just as unreasonable to ask a man who

wished to study medicine, to go out and find out for himself instead of going to a medical college. Our Agricultural Colleges have turned out a number of very brilliant men who are rendering great service, but there are a lot of young men in this society who will be glad to take the places of the old men when they have to retire, and I consider that this new Society will render very valuable services to the country.

I am very pleased indeed to hear you are satisfied to stay where you are, and that you are anxious to introduce a post-graduate course at some one college. I think this is a distinctly progressive move on your part, and a move that will have very excellent results. I am sure this post-graduate course will freshen up many of you in the work you have been carrying on, will give you a new start and will have a large place in the agricultural progress of this country.

I think you are particularly fortunate in the selection of officers, particularly in that of your President. I have known President Klinck for a number of years. I know you all join me in extending to President Klinck our best wishes for great success in his new position. It was a great pleasure to me to notice that he had been selected, and I am quite satisfied that he will guide this Society in a very satisfactory way.

I notice you have also selected Prof. Barton of Macdonald College, as Vice-President. Prof. Barton is a man of high standing and recognized ability in this country and one of our leaders, and also Mr. Newman as Secretary-Treasurer. I think that as far as the future of the Society is concerned, you have certainly placed it in very good hands.

A number of you are no doubt listening to what I am saying and you are saying to yourselves,

"That is all right, but how much money are you going to give us?" I am pleased to say that I will make an effort to include in the supplementary estimates a satisfactory sum to assist your association on its way. I think money could not be better expended than in this way. It is absolute foolishness to expect that every dollar expended will bring back another dollar. Our experimental farms and associations of this kind are doing a very valuable service to the country, but you

cannot put your hand on the dollars that they return; nevertheless the service is there.

I am pleased to welcome you to the City of Ottawa. You will find a number of very nice people here, and I am sure your stay will be made very pleasant. I have much pleasure in extending a most royal and hearty welcome to you on behalf of the Department of Agriculture, and if we can be of any assistance to you, I am sure we will be delighted to do so.

ADDRESS BY DR. J. H. GRIDDALE, DEPUTY MINISTER OF AGRICULTURE.

Mr. Chairman, Hon. Dr. Tolmie, and Fellow Members of the C. S. T. A.:

I am delighted to be with you on this occasion. We have at this meeting representatives of very nearly every class that has gone through Guelph since I can remember, and some representatives of classes who went through before I was at the O. A. C.



I do not know why I have been called upon to take part in this meeting. After the eloquent address of welcome from Dr. Tolmie, whom I suppose we can call the principal agriculturist in Canada, any remarks on my part would seem out of place.

We are met here today for organization purposes particularly. It has always been noticeable among graduates of universities that they have a fellow feeling, a feeling which expresses itself usually in university associations and in other associations of the different branches in which they work, and which might be said to have its apex in the Royal Society of Canada. I felt when this society was mooted that it would lift our graduates to a higher status and give to the members who constitute this body, a feeling of greater importance and a feeling that they had a place among the educated and highly trained leaders of the country. We have been looked upon by many of the University Associations and many of the university graduates as being men on a lower level in investigatory character than they are themselves, and we cannot expect them to change their minds in this respect unless we assert ourselves and demonstrate to the world that we have just as high scientific and investigatory powers as have these other mere graduates of institutions in other sciences. That should, in my opinion, be one of

the principal functions of this organization once it is well established, and, judging by the excellent attendance we have here today, we should be very much encouraged. The attention we give to this work, will be the measure of our success in building up this society. It is true the science of agriculture is so varied in character, and covers such a wide field, that it is hopeless to expect every man of us to pay that very close attention to the details of investigatory work in each and every line, that he will need to give to the work in his own line. Still, as men intensely interested in agriculture in this country, it will be quite possible for us to encourage these varied investigations by favorable comment, by laudatory criticism and by really helpful work among ourselves. I have no doubt judging by my own experience that each man who leaves one of our agricultural institutions goes out feeling that he has a mission to perform in this world. I can remember when I graduated, I undertook some work in pig feeding; it was exceedingly simple as I look back at it now, and really did not amount to much in the way of work; yet to me it seemed at that time a matter of the very greatest consequence. I am glad to say it did have some effect. There is absolutely no reason why every man in agricultural work should not have some objective in view, some line of work that he can carry on in an experimental way, and we who are connected with agricultural institutions can help in many ways. Let me urge upon you that this be one of the first and most important functions of this Association.

Dr. Tolmie has mentioned the fact that the Dominion Department of Agriculture is trying to help the Society. That, however,

should be a matter of secondary consideration. There are many reasons why it might not be possible to make such a grant. We as a Society, I believe, can get along without it if necessary. Each one of us who leaves here, feeling that this is his own association and that he is bound to do something to help it along, will be a factor making for the success of the organization. We can without doubt make this a live organization that will have a very lasting effect upon the Agriculture of Canada and upon our own status as a scientific body. We are proud to have among our graduates of Agricultural Colleges in Canada some of the best agriculturists in the world; many of the heads of the investigatory institutions in the United States come from this country; there is hardly an institution in the United States that has not one or more graduates of a Canadian agricultural college on its staff.

We are met here today a body of men known the world over as men who are keenly interested in their work, who are now banded together in organization, possibly the first organization of its kind in the world. I know of no such organization in the United States. This organization is, as I take it, for the purpose of strengthening our hands, of giving us a standing, of making agriculture a really scientific industry, and of giving to agriculture in Canada a name that shall be equalled in no other country.

I wish you, Gentlemen, the very best of success in your deliberations. I trust we may be inspired to continue in the good work and that we may leave here with a fellow feeling that will make us even more ready, if possible, to co-operate in the future than we have been in the past.

ADDRESS OF WELCOME BY MAYOR FISHER, OF OTTAWA.

Mr. Chairman and Gentlemen:

I understand you have a very full programme, and therefore I will not take much of your time. I simply desire to make my bow and to thank you for the privilege of being allowed to do so, because it is a very great privilege to appear before this Society. You are engaged, as I discover from your programme, with the basic industry of agriculture. I would not mention it if it were not for the fact that a number of gentlemen here know me to be a lawyer, and in these modern days, for a lawyer to be allowed to speak with gentlemen engaged in this basic industry of agriculture, is a great honor.

I have been in municipal politics for several years, and during that time I have not been mixed in any other politics, but there was a time when I used to go out into the country to try and persuade the farmers to come into my party. There were not a great many of them that would come in. Now, the farmers have formed a party of their own, and they have laid out a platform that looks very much like what I used to try to preach in my humble way, and I find myself in this very different position that they apparently do not want to come into my party, and it is very doubtful if they will let me into theirs. I do not know that the door is absolutely barred, but it is apparently temporarily shut to the members of the legal profession.

You are the gentlemen, I understand, who teach other men how to do the work. That surely is a very pleasant employment, and I am quite certain in this instance that it is a very useful one. The people now are ready to be

guided, and I am of the opinion that if we only have the proper leaders, men who will tell honestly what are the country's needs, there is a great deal of hope that the people may be ready to follow to the great advantage of the country as a whole. I think we should have somebody who should tell us that it is not a question of buying more goods in Canada but of buying less goods anywhere. This "Made in Canada" campaign is all right provided it is not carried too far. Let us try to make things in Canada that we need, and that we can make economically. It would not be useful for me to attempt to say anything in regard to your particular occupation. I can remember the farms of Canada 25 years ago, and there is no doubt that great changes have taken place, and as changes have come there has been a higher intelligence in the farming community. Let us hope that the Powers that Be will not overlook the people who have been engaged in research work and who have been doing experimental work and work of that kind for many years. Those of us who live in Ottawa know that there have been in this country many men in the Government employ and the employ of other institutions who have been doing very real work for which they have not been very adequately paid, and I think the country generally has come to the position where it is prepared to admit that these men should be better paid and to back the Government up if they have the courage to put into effect a better scale of remuneration.

I have much pleasure in welcoming you on behalf of the people of Ottawa. We are pleased to have you here and we hope your convention may be successful and that you will enjoy yourselves.

ADDRESS OF MR. F. N. SAVOIE, REPRESENTING HON. J. E. CARON, MINISTER OF AGRICULTURE FOR QUEBEC.

Mr. Chairman and Gentlemen:

My address will be very short. Before leaving Quebec I went to see the Minister and try and urge him to come to this convention because I was sure that he would have very interesting things to tell us. Unfortunately, he could not leave Quebec, and he asked me to represent him at this convention and to give his message. He wishes every member of this convention all success in their deliberations and in the future. His heart is with us and anything he can do to help the Society in every way possible he will certainly do. I am sure he is much in favor of the organization of such a society, and no doubt he will be of assistance to us in the future.

The Province of Quebec was discovered in 1608, and since that time there has been some progress made. We had the first school of agriculture on the continent, started in 1859. We had the first

school of Household Science, not only on the continent but the first in the world. We now have three agricultural schools in Quebec, five schools of household science, and 59 secondary schools of household science. I hear that some people have not yet discovered the Province of Quebec. If you will come down and see us we will give you the best reception that we can. We are trying to do our best the same as you all are in other parts of this Dominion. We would be delighted if the next convention was held in Quebec City.

I must say that I have enjoyed the deliberations at these meetings. We have very wide fields of action, and our ideals are very high, and I feel confident that we shall realize them. There is a motto that will fit us very well. It is the motto of one of our colleges in Canada, and it is one that we should aim at:—"Mastery for Service."

TECHNICAL AGRICULTURISTS IN RELATION TO AGRICULTURAL PROBLEMS.

DR. JAMES W. ROBERTSON.

Mr. President and Gentlemen:

I appreciate the opportunity of this occasion to speak to so many of you who are now members of this new Society, and to offer my congratulations to your President upon the recognition you have accorded him in electing him your first president, an appointment well merited by the valuable services he has rendered to agriculture and education.

I am glad you have formed this Society. There is a place for it and work for it to do. I have known many of you; and when I think of you severally I think of men of good natural ability devel-

oped into greater ability by training, further enlarged and improved by experience in administration, teaching and other useful work. Consequently this Society



should be strong because its members represent great intellectual and moral power. But the sum total of the qualities of its members does not represent fully the power of a Society like this. Every member in contributing service to the Society, as an organized body, becomes thereby a stronger man personally, while the effectiveness of the organization itself, as an entity, becomes greater than the sum total of the qualities of the individual members. A simple illustration: Take 20 men; consider their strength of body, their agility of foot, their intelligence, and their courage and say of them "They are a pretty good lot of men." If you could devise a mathematical or other formula to represent the ability of them severally and add those into one total you would have something to wonder about. But if you organize the 20 into a fire brigade, the fire brigade is worth more in putting out and in preventing fires than any 20 individuals. The fire brigade as an organization has a different kind of effectiveness from that of 20 unorganized individuals. I hope your Society as an organization will do great work for Canada; and that all of you, because of its work, will be stronger and more efficient singly and severally.

Subjects, Problems and Persons.

I look back and remember the first five graduates of the O. A. C. They were students while I was a professor there. Last week I looked over the examination papers that were set for those who were hoping to graduate this year. These papers disquieted me into the conviction that I knew scarcely anything at all about the subjects. I have always been impressed, sometimes oppressed, by the feeling that I did not know enough about subjects. Nevertheless I have had occasion to deal

with many problems; and it has been necessary for me to understand something about their solution. For more than 30 years, knowing my own inadequacy, my difficulty has been to find fellows who knew and could do, and get them on the job; and I indulge myself in these ripening years with the reflection that I did that part of my work reasonably well. I hope still to help in finding many persons and to see them placed where they will do good work.

Let me ask your attention to that word "problem." We now have the problem of the luxury tax and also the problem of oatmeal "versus" cornflakes. Everything perplexing is called a problem. I looked up the dictionary to see what it says about the word "problem": "A perplexing question demanding settlement." I want you to think about one particular agricultural problem as a problem demanding settlement—settlement in actual conditions on the farms in Canada. I hope it will be the duty and privilege of the technical agriculturists to contribute to the settlement.

The one problem I want to discuss with you is the problem of helping the average farmer. He may not believe in agricultural colleges or in college graduates. You say he ought to. Don't forget the fact that he may not believe in agricultural colleges as being of any practical benefit to the practical farmer. He may not have any use for experimental farms as run by Governments. If so, I think he is wrong. But don't forget the fact that his opinion may not agree with mine or yours. The problem in Canadian agriculture is to help that man, the average farmer. The technical agriculturist should help the average farmer to solve his problems successfully, and he must not forget that there are many farmers who think that a man who is educated

by going to college has acquired no kind of ability to help them in their practical work. They suppose he has been removed from their field of business, farming, and will likely come along with some high-worded theory and suggest things that are not practical.

Qualification Through Education.

What qualification has the technical agriculturist to enable him to help that man and make that man quite willing to accept his help and even anxious to obtain his help? His education should qualify him; and if it does not he should seek re-education and pursue it diligently. There are many contributing factors in the processes of what is called education. May I call to your minds some of the things which you should have got out of the processes of education? My acquaintance with men does not lead me to think that they always get what they should have got. On two sides a man can get what is worth while in a college course — on the intellectual side and the social side. I am sure that you will agree that the processes of education were not confined to the courses of study, they were not limited to what was done in the class-rooms and laboratories. If I should attempt to interpret to you, for a few minutes, my present impressions of what may be expected from the best processes of education I would submit for your consideration that such processes, which I hope will continue as long as you live, should produce skill — skill in living. Through the acquisition of knowledge and the development of intelligence come the beginnings of skill in thinking; through discipline in doing comes skill in working; through the exercise of judgment comes skill in managing. In addition to the cultivation of the intellectual powers the processes of education must not leave

out the development of the spiritual senses. By spiritual senses I mean those qualities which enable and cause men and women to live at their highest and their best in the common as well as the uncommon conditions of everyday life. Through the cultivation of the sense of proportion comes skill in appreciating. Through daily exercise of the sense of responsibility comes skill in serving. Through a quick conscience, in obedience to self-discipline, comes skill in living. Out of all such experience, which for convenience of expression I have indicated as separate, but which are inseparable in the growth and development of character, we come to recognize and hold to some noble purpose in life, definite and dominating.

Agriculture and Farm Surveys.

A word or two as to this particular problem of agriculture, the problem of helping the average farmer. What is agriculture in this sense? It is a skilled trade like a handicraft; it is a business, a business carried on for profit; it is a profession dealing with the application of principles to the art of farming. And it is more than all that. It is a way of living. If you go into a shop or a factory, it is a place where a man works, but a farm is where a man and his family live. Therefore, agriculture is not only an occupation, but it is a way of living. It is also a great national interest. It is an interest that concerns the nation. It affects all the people. Agriculture being that sort of thing, this particular problem of helping the ordinary average farmer must be an important problem. How can you find out how that man looks on these things which we call problems? How will you find out what he is thinking about except by going to see him and finding out from

him? That is one of the objects of a farm survey. Through it you obtain a knowledge of facts. From the study and proper interpretation of them you come to conclusions. Out of these you shape your policy, make up your programme, and formulate your plans. That was the course followed by the Committee on Lands, of the Commission of Conservation. Since I have been Chairman of that Committee since its formation, I can speak with intimate knowledge of its work, to which I now invite your attention.

Committee on Lands.

Under its Committee on Lands the Commission began its work by ascertaining as fully as practicable the condition of land under cultivation and whether the systems and methods of farming were resulting in the conservation of fertility and productivity. For several years it conducted surveys of conditions on groups of farms in representative districts in every province. The surveys were made for 62 groups which contained a total of 2,245 farms. The detailed results were reported upon in the published Annual Reports. They revealed the fact that in many cases fertility had been and was being reduced, weeds were becoming increasingly prevalent, and systematic courses of rotation of crops were not being followed. At the same time in every group of farms surveyed, some farms stood out conspicuously as examples of conservation, and at the same time as illustrations of profitable agriculture. In consequence, one of such farms in each of the first groups surveyed in 1912-13 was chosen by the neighboring farmers, in co-operation with the Commission, as an Illustration Farm.

Illustration Farms.

The Illustration Farm was not in any sense taken over by the

Commission. The Illustration Farmer did not receive any salary or subsidy. He agreed to accept regular visits from the Agricultural Adviser sent by the Commission and to put into practice on his farm only such advice or suggestions as he considered would prove profitable to him. The Commission gave a little financial assistance to encourage the use of seed grain of first class quality and suitability, to try out the sowing of larger quantities of clover and grass seeds per acre, and to bring about more effective methods of cultivation to suppress weeds. The object of the investigation by the Commission, in co-operation with the Illustration Farmers, was to discover whether the combination of expert and scientific information and advice from the Commission with the profit-making methods of the practical farmer would result in the conservation of fertility, increase the profits, and bring more satisfaction to the farmer and his family from following the occupation. Meetings were held on these farms to explain the system and methods to neighboring farmers and to demonstrate what these were accomplishing when applied, not on a government farm, but on one such as the farmers themselves occupied and under conditions similar to those with which they had to do. The results were striking and improvements were notable and numerous. There was a pressing demand for these Illustration Farms in other localities. But the Commission, not being an administrative Branch of Government Service and having accomplished its object in pointing to an effective means of promoting conservation and profit, turned over the scheme to the Department of Agriculture. There is now an Illustration Farms Division of the Dominion Experimental Farms.

Illustration County.

The success which attended the Commission's survey of Farms and resultant Illustration Farms, led the Commission to conduct a survey of four counties and to select an Illustration County. The plan followed in and with the County is similar in principle to the plan adopted with the Illustration Farms. The work in Dundas County, Ontario, has still to go on two years of the five-year period for which it was undertaken.

I am confident that as a result of this bit of experimental research in conservation, through Illustration Farms and an Illustration County, you will find Illustration Farms in every county or municipal district in Canada before many years. Moreover, the definite and definable progress made in the Illustration County of Dundas will have made such an impression that the underlying principles of the policy and plan of Illustration Farms and Counties, will be generally accepted and commonly applied. The essence of the scheme is to discover, develop, and call into use the ability and character of the best men and women of each community for local leadership; and to supplement that by helping to bring into each community the best things of any community, in proper relationship to all of the other best community services and conditions. By these latter I mean such things as good farming, good schools, good roads, good markets, good health and good community life. I have said "good," but on the Illustration Farm and in the Illustration County we want proper co-ordination of "the best" in order that all these services and conditions in the community may be good.

Further Organization Needed.

For the conservation and improvement of the fertility of its lands and the production of crops and animal products in the most effective and profitable ways, Canada is, as yet, imperfectly and incompletely organized. This does not refer so much to the organization of the departments of Agriculture of the Governments, Federal and Provincial, as it does to the lack of organized means by which the ordinary farmers may be enabled and will be induced to bring their farming up to the present level of the best farmers. The chief obstacle is that the application of the knowledge which is now possessed and used by the best farmers is, as yet, to a large extent not operative in the case of the ordinary farmers. And it must not be forgotten that the kind of management and work on the ordinary farms by the great body of Canada's intelligent, capable and industrious rural population, is what determines the prosperity, stability and progress of the country.

Agriculture is to be regarded as a national interest as well as an occupation followed by individuals to earn their living. As a national interest very much more can be done and should be done for its further improvement. We will have to rely, in the main, on the improvement of agriculture and the further development of our other natural resources and industries to enable us to maintain prosperity, to pay our way as a nation and to pay our public debt. Moreover, in the keener competitions we are sure to meet in the world's markets we cannot expect to hold our place unless our people are as well informed, as well trained, and as well organized as others.

I venture to submit five propositions regarding further organiza-

tion required to help in the advancement of the average farming of the country and in the conservation of the fertility and productivity of our lands.

(1) Provision should be made, particularly by the employment of highly qualified men and women, for further research investigations in the field, in the laboratory and in the market.

(2) Experimental work should be continued and co-ordinated on Government Experimental Farms in trying out and comparing methods of applying knowledge, already possessed, to the practical operations of farming in order to obtain the best economic results under the varying conditions of soils, climate, markets, labor, and other available resources.

(3) Provision should be made, through competent Editorial Boards or Committees, for compiling, studying, interpreting and publishing, in simple terms and in reasonably short form, the conclusions arrived at by reliable adequate investigations anywhere so far as these may be applicable, with the prospect of advantageous economic results, under Canadian conditions. Such Board or Committees might be formed, in the first instance, for such large and general subjects as:—

(a) The relation of the physical condition and chemical composition of soils to the production of crops.

(b) Systems and methods of producing field crops in relation to profits and the conservation of fertility.

(c) The breeding, feeding and care of live stock and the marketing of animal products.

(d) The production and marketing of fruits and vegetables.

(e) The control of plant diseases and injurious insects.

(4) At least one Illustration Farm should be chosen by the farmers in every considerable com-

munity on which they could see for themselves the results from the practical application of a combination of scientific information and advice from an expert with the profit making system and methods of an experienced successful farmer.

(5) A Neighborhood Improvement Association or Better Farming Club, in close association with each Illustration Farm, would become a means whereby the natural leaders of the locality would be brought into full play for the development of every farm and farmer, and the improvement of the whole community.

Probable Results.

Such a scheme of organization would provide the means whereby the discoveries, information and recommendations of the best institutions, the best minds, and the best work would be brought home to the average farmers with unparalleled beneficial results. It would cost a comparatively small amount of money. Its practical evolution and application offers an unsurpassed opportunity for the best brains, hands and hearts in Canada. When in full operation it might be reasonably expected to bring about an increase in the annual value of the output of the farms by from 20 per cent upward with scarcely any increase of expenditure. That estimate is not mere conjecture. It is based on knowledge of what has already been accomplished in localities surrounding Illustration Farms. At the current range of prices 20 per cent increase would represent between \$300,000,000 and \$350,000,000 as the weather conditions were less or more favorable; and the fertility and productivity of the farms would be conserved and improved continuously.

You can do a great deal as technical agriculturists to advance the organization suggested or to bring

about by some other means the solution of our most difficult and important problem in agriculture—the continuous improvement of the average farm and the betterment of the whole rural population. Your Society can do still more towards the accomplishment

of that end. You can do things that will be entirely creditable to the race and blood to which you belong, to the breed from which you have sprung, and to the institution in which you have been trained. And the more you do, so much the better will it be for Canada and for the world.

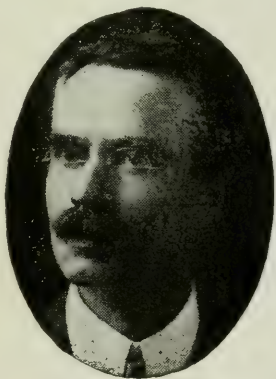
A VISION OF AGRICULTURE.

President J. B. REYNOLDS, Ontario Agricultural College.

Your old men shall dream dreams, and your young men shall see visions.

Dreaming on Things to Come.

There are those who dream, and those who execute. The dream is the thing. Nothing has been accomplished in human progress that has not previously been dreamed. Amos Cruickshank dreamed the Shorthorn, and Cecil Rhodes dreamed the world-wide influence of the British Empire. Blessed are they who can dream



and blessed are they who can execute. Twice blessed are they who can both dream and execute.

The dreamer is an idealist. He dreams of the perfect, of heaven.

Heaven is the vision of fulfilled desires.

Scorn not dreams because they seem impossible. For impossible as they are, they lift us nearer to the heaven of our desire.

Agriculture has invited the dreamer of all times. The wilderness and the solitary place shall be glad for them, and the desert shall rejoice and blossom as the rose.

He will cause to come down for you the rain, the former rain and the latter rain in the first month, and the floors shall be full of wheat, and the vats shall overflow with wine and oil.

And I will restore to you the years that the locust hath eaten, and the cankerworm, and the caterpillar. And ye shall eat in plenty and be satisfied.

Every grim ravine a garden, every blazing desert tilled.

Robed in universal harvest up to either pole she smiles.

The Dream of Possession.

Every man who wishes to till the soil and is able to till it well, should have the right to do so, and no private ownership should interfere with that right.

Possession of land should imply tillage. So long as a man, or his family, continues to till a farm, he should have possession. When he ceases to farm, he should cease to own.

I would have no bidding for absolute private ownership, but bidding for the right to till the land.

Under the feudal system, the King owned all the land, and leased it for certain considera-

tions of service. The modern equivalent of that idea is, that people should own the land, and lease it to those who are able to give payment for its use. The land of Canada was once public property. It should have remained so, and every one wishing to occupy land should be allowed to do so, either free or for an annual rent. But an unalterable condition should be that he or his family should work it.

The speculator in land is a hindrance to the progress of the country, for by his absolute ownership, he is debarring someone from the rightful use of the land, or taking unlawful toll from the labor of other men.

The tiller of the soil, instead of investing his savings in procuring absolute ownership of the land he tills, should return part of the products of his labor to the state for the use of the land, and save the rest to keep him in his old age.

As this is only a dream, practical details must not be expected or asked for.

A Dream of Mastery.

No wise person will embark upon a career in which he is pretty sure to suffer distinct defeat. A sense of mastery is essential to happiness and self-respect. Not just to win, but to be confident of winning, is the inspiration of the daily task. Lacking that confidence, lacking the power and the opportunity to conquer, life is drab and hopeless.

The farmer is in constant conflict with the powers of nature. Natural laws and natural phenomena, the wind and the rain, heat and frost, cloud, fog, and sunshine, are the atmosphere in which he labors, and the forces with which he is engaged. These are largely uncontrollable factors, and yet the problem of the farmer is to secure a measure of control, or so manage that he can be indifferent to or independent of them.

Drainage, irrigation, tillage, crop rotation, diversified farming, are the varied means by which the farmer gains mastery over the unfriendly forces of nature.

Man has learned to make use of only a few plants and animals. The rest he considers useless and harmful. Those he has learned to use he has developed and improved according to his own ideas. The useless and the harmful he seeks to destroy.

At War.

But here nature and the farmer are at variance. In deciding what is useful, and what is useless, in propagating the one, and destroying the other, the farmer has defied natural environment, natural selection, and the law of the survival of the fittest. For natural environment the farmer has substituted an artificial environment, and his pure bred live stock must be housed. For natural selection he has substituted human selection. Human selection has produced the short horn and The Angus and The Hereford. Natural selection produced the Moose. For the law of the survival of the fittest the farmer has substituted the law of survival of the most useful. He has ordained life to the sheep and to the wheat plant, and death to the wolf and the thistle.

For these defiances of nature's decrees, the farmer suffers the penalty of nature's hostility. It is war. Indeed, agriculture, is the moral equivalent of war. By skill in breeding and selection, by protection and fostering care, the farmer has produced his improved live stock, his cereals, grasses, vegetables and fruits. Nature unaided never has and never would produce the plump berry of the wheat, the full-flavored Northern Spy, or the full udder of the Holstein. If left to nature these would speedily degenerate. Eternal vigilance is the price of suc-

cess. Let the farmer withdraw his protecting care, or relax his studied vigilance, and nature will speedily avenge herself against the farmer's partiality.

Essentials to Mastery.

In this warfare, a knowledge of the conditions is essential to mastery. He is half prepared for the fight who knows the enemy's intentions. My dream is that every farmer shall be a student of natural science. Here is the field of the agricultural technologist. By research, experiment, and propaganda, the technologist helps the farmer either to enlist nature in a cooperative effort, or by knowing her intentions and her methods, to combat her successfully.

It has been remarked that agriculture is the moral equivalent of war. When men have learned to live peaceably with one another, they will then be able to turn their attention to an important branch of the real business of civilization, which is, to obtain mastery over the powers of nature. How much further on the road to that mastery we should now be, if the science, the energy, and the wealth that have been expended in war since 1914 had been expended in exploring and mastering the secrets of nature!

Mastery in the realm of nature, not master in the world of men. For the farmer is not only an agriculturist—a tiller of the soil. He is also, if not by choice then by compulsion, a business man, a dealer buying and selling in the markets of the world.

The merchant is a trader only. He buys and sells, but does not produce. And in the buying and the selling there is usually one who buys and another who sells. There is a separation of function and a division of labor. The manufacturer buys his raw material, produces and sells. But in this busi-

ness also there is a separation of function, and division of labor. One buys, another produces, a third sells.

Generally, in Canada, the farm business does not permit this division of labor. The farmer is his own buyer, his own operator, his own salesman. Thus his attention is divided. Nor has the syndicate farm been successful. The small farm seems to be the type. The problem is, how can the farmer of 100 to 300 acres best combine the two functions of business man and agriculturist.

Two Problems.

There is a double aspect to farming as a business undertaking—the internal business of the farm, what we call farm management, and the external relations, or marketing. To determine what the farm is best fitted to produce, is one problem, taking into account climate and soil and available markets. The next is to lay out a system of rotation or a method of fertilizing whereby the revenue is secured and the capital—the soil fertility—left unimpaired. The relation between capital and overhead expenses, and revenue is another problem. How are the annual charges of interest or rent maintenance, labor, and living expenses to be met? Book-keeping on the farm is a most disheartening business. A good many farmers when they keep books become alarmed at what the books reveal. They seem to be going behind every year. Interest, depreciation, labor, maintenance costs, consume apparently more than the revenue provides. As a matter of fact, no one branch of the farming business is profitable by itself. Each is a by-product. If the farmer charges his live stock with the market value of the grain and hay they consume, his live stock is liable to show a deficit. If he charges his upkeep, the repairs to

buildings and implements, with the market value of the labor expended upon them, upkeep makes an alarming inroad upon revenue. If he charges his revenue with the interest on capital invested, his labor income often vanishes. All is a compromise. Much that he feeds his live stock has no market value. They must live for the most part on roughage and waste products. The hen is required to scratch her own living, and the cow forages for herself along the fences. Much of the farmer's labor is given free, after he has done a full day's work, not to mention the work done by the family, which is nearly all free. On the principle of bye-products alone can the farm be made to show a profit. Yet it is desirable that every farmer give his mind to the question of cost and production. If he does so, persistently and intelligently, his rewards will be greater and his satisfaction and contentment increased.

Organize.

In conducting the external affairs of the farm, the farmer to-day finds himself confronted with what looks like huge combines and conspiracies to rob him of the results of his labor. Trade, transportation, and tariff all seem to be against him. How can the farmer singly combat this system? How can he secure a living and at the same time attend to the main business of his calling, production?

I see no answer to that question except the word "organize." Organize for economic reasons, to buy and sell. Organize for political reasons if necessary to compel government to give attention to the farmer's claims.

The joint stock company is the favored method of organization in city industries. It has never fitted into rural conditions, or suited the rural mind. The dollar is the unit of power in the joint stock

company. The farmer is too much of an individualist to subordinate his soul to the shekel. He requires some type of organization in which his individuality counts, regardless of the number of dollars he can bring. And so the co-operative society has been devised, with its principle of "one man, one vote." In the co-operative society, probably lies the solution of conducting successfully the affairs of the individual farmer. Even in his co-operative society, the farmer learns that he must subordinate some of his individuality to the common good. He must acquire trust, learn to pledge his word, and to keep it though seemingly to his hurt, and be willing to adopt the social idea of majority rule.

A Dream of Service

The farmer is the only creator of wealth. The miner, the lumberman, the fisherman extract wealth already provided in the reservoirs of nature. The manufacturer transforms, the merchant and the railroad man transport. The miner, the lumberman, the fisherman, the manufacturer, divide and substract and diminish the potential wealth of the world by their labors. The farmer adds, multiplies and creates some thirty, some sixty and some an hundred fold. The farmer is one with the Creator in the great enterprise of providing food for the world. As one of the ancient poets has said, "these wait all upon thee, that thou mayst give them their meat in due season." And as a certain one of our own poets has said, "Godlike, he makes provision for mankind."

The farmer performs a great service for mankind. And my dream is that more and more he shall be enabled to do his work in the spirit of service, and not for reward. Farming is not so much a business as a calling and a way

of life. He only is the true farmer who loves his work, who feels impelled to his calling, who is drawn to it by invisible cords of destiny, "Woe is me," cried the Apostle, "If I preach not the Gospel." "Woe is me," cries the true farmer, "if I till not the soil." Each, the Apostle and the farmer, receives a call. Each embarks with joy and confidence upon his great adventure. He can do no other.

Necessity compels the farmer to be two men in one. He must be a business man. He prefers to be a husbandman. When the cares of business do not press too heavily upon him, he can yield to the joys of creation. He can do his work for the work's sake, for the love of growing things. He is a free man, conscious of partnership with the divine in providing for humanity's first need.

This world cannot be redeemed from its present pain, and unrest until men are willing to do with their might what their hands find to do, in the spirit of service. Agriculture must lead the way.

A great Latin poet thus dreams of the life of the farmer: Some vex the blind bays with oars, and crowd the thresholds and the halls of Kings. One threatens the city and the homes of the wretched with destruction, that he may drink from bejewelled cups and lie upon Tyrian purple. Another secretes wealth and broods upon buried treasure. One is amazed at the rostrum, and is carried away by the applause of the people and the fathers echoing along the

benches. One gloats over the blood of his brethren, or changes the home and the precious hearth for exile, and seeks a country lying under an alien sky.

The farmer turns over the soil with his curved plow. Hence is the labor of the year, and hence he sustains his country and his little children, his herds of cattle, and his deserving oxen. Nor is there rest, until the year abounds with the young of cattle and the harvest of cereals, and the furrows are laden with produce and his barns are filled with plenty.

Comes the winter: The olive berry is ground in the mill, the swine return fat with the acorn, and the bushes have yielded their berries. Autumn has given up her varied fruits, and high up the vines have ripened on the sunny rocks.

Meanwhile sweet children hang upon his lips, his pure home guards the modesty of his children; the udders of his cows give down the milk and the fat lambs have played in the rich pasture.

Formerly this life the ancient Sabines followed, and the founders of Rome; thus Etruria grew great, and Rome became the greatest city on earth, and surrounded her seven hills with a rampart. Even before the rule of Jupiter, and before an impious race has feasted on the second sacred oxen, golden Saturn lived his life; nor had men heard the blast of the trumpet, nor the swords clatter upon the anvil.

STUDY COURSES AT OUR AGRICULTURAL COLLEGES.

Dr. F. C. HARRISON, Macdonald College.

Mr. President and Gentlemen:—

The subject which the Organizing Committee asked me to speak on is "Study Courses in our Agricultural Colleges." In the space

of time that is given me to open this discussion, it is impossible to outline the courses with any degree of detail that would be of use to those who are interested

in planning such courses either from a departmental standpoint or from the larger one of a degree course. All I shall attempt to do is to bring certain broad outlines before you as to what may be taken up in such courses.

To begin with, before setting out any kind of course, the first requisite and the most important requisite to my mind is a survey of the field in which you are intending to operate, and the class of men that you wish to turn out. If you wish to graduate specialists in animal husbandry or in horticulture or any of the sciences, you have got to fit your course for these requirements. On the other hand, if you are intending to turn out men who are going to be agricultural representatives, another kind of course will be needed, so



that I think the first desideratum in planning a course is to make a very careful survey of the field. This method of survey is also true not only of the four year course, but the shorter courses which are given in a number of institutions.

You are familiar with the two-year course which has been part of the preparation for the four-year course, intended to equip those who are returning to the farm, and also those who wished to go forward for the four-year course. Such a course (like a dual or general purpose animal) can neither excel as a two-year course, nor as a four-year course, and I am glad to see that a number of

institutions have recently acknowledged this fact, and are now planning their course differently.

If you wish to direct your attention to planning courses for the man who is going to return to the farm, there are other things you have to think of: What length of time can he afford? Can he come at the end of September or beginning of October and stay until the end of April? Can he remain for one season or two? Such considerations have to be looked into and very carefully studied before any progress is made in outlining a course.

For the four-year course it is first necessary to take into consideration the entrance requirements. What are your entrance requirements going to be for the four-year course? Are you going to accept a certain standard for the first two years' work, and allow students to go on, or are you going to insist upon a certain educational attainment before they commence? I do not wish to be dogmatic on this point, but I do think that it is very necessary that a well defined entrance requirement should be insisted upon for men who are going forward for their degree.

We find that other universities are insisting upon higher entrance requirements and that they are insisting on longer courses of 5, 6 and 7 years' duration. This is especially true of applied science, medicine and law, and I think it should be equally true of agriculture, because it is impossible to turn out a thoroughly trained man with an imperfect entrance equipment in four years. I should suggest, therefore, that the entrance requirement of a course leading to the bachelor degree should be the "School Leaving" examination of the Province, Junior matriculation as in Ontario, or the final examination held at the high school, collegiate in-

stitute or academy. Entrance requirements for non-graduate courses may not be so obligatory, but for the bachelor degree, I think it is essentially necessary for a man to go forward with a progressive course. Further, if he has not got a proper entrance requirement, and he goes forward for postgraduate work, some institutions will not receive him unless he has the equivalent of three or four years high school work. The postgraduate work in the majority of the larger colleges in the States will not allow him to take his master's degree until he writes off this disability. Therefore, the minimum requirement for entrance for Degree courses should be the School Leaving examination.

Another requirement for entrance should be some previous farm experience. The majority of agricultural colleges do not attempt to teach elementary farm operations. They are best learned upon the farm, and I believe both in the United States and here such requirements are being more and more exacted. At least one season from seed time to harvest should be spent on a farm, and preferably on a Canadian farm. In the case of students coming from abroad, farm experience in their own country would be sufficient if they were going back there, but if they intend to stay in Canada and if they want to know the conditions here, I think they should spend the time mentioned on a Canadian farm.

To turn to the courses themselves, I find considerable difficulty in simply reciting to you the whole list of the various subjects. I can only group them. I should first of all like to insist upon the importance of the sciences to agriculture. They are as important to it as the sciences are to medicine. Unless you have a good foundation in Biology, Chem-

istry and Physics you are going to fail when you take postgraduate work. In medicine and applied science, the universities are insisting upon better science preparation. In medicine two or three years' preparation in the sciences is demanded. In Applied Science, the general course is the same for two years for all students, no matter whether they specialize in mining, civil engineering, railway engineering or any other branch of Applied Science. I should, therefore, like to insist on this point that the sciences be given a very substantial part of the time allotted to the course in the first two years, and a fair share in the final two years as well.

If we divide our subjects into three main groups, we may take the science group, comprising first, the biological sciences, which include not only Botany with all its branches, but Horticultural Botany, Pathology, Entomology, Bacteriology and Genetics, the last of which I think should find a very important place in all specialists' work in agriculture.

Secondly, Chemistry with all its various subdivisions, Organic and Inorganic, Nutrition, Chemistry of Fertilizers and Food stuffs, etc.

Thirdly, Physics, in which we want to have a broad general training in physical laws, with special work in soil physics and also a certain amount of the physics of light, heat, and electro magnetism.

A course is also necessary in the Geological Sciences, in order to explain soil formation.

The second main group comprises the subjects of Animal Husbandry, Agronomy, (including field crops and soil); Horticulture, Poultry, Agricultural Engineering, Apiculture and a number of other practical subjects.

The third main group I shall term "cultural," and the most important under this heading is Eng-

lish, both written and spoken. Practice should be given to all students in how to present a subject to an audience. English is fundamental and cultural; students who lack good English training do not get the most out of their courses and are handicapped throughout their college career. Economics is important, and attention should be given to Rural Sociology. A course in Economics is more necessary to-day because of the recent political movement among farmers. We must give students a good foundation in Economics in order that they may take their place in our Legislative Assemblies and have a broad sound knowledge of those great economic questions that are discussed from time to time.

Inasmuch as the majority of our graduates, no matter what they go into, have some kind of teaching to do, whether it is in the class rooms or to audiences of farmers or children; I think that a course in the Art of Teaching or pedagogy should be added to our curriculum. When you think of the number of graduates that have gone out with no instruction of this character and who do not know how to present a subject, you will agree that it is most important that some training should be given along these lines so that they can teach the subjects in which they have specialized.

Another subject of the "cultural" group, whose value is much debated, but which nevertheless does find a place in some colleges, is a foreign language. In Quebec two languages are official, and if there is only one language taught it should certainly be French. A knowledge of several languages is a great asset to anyone going into science, in fact it is almost necessary before one can do research work. Even if you do not have a speaking knowledge, it is necessary to have a reading knowledge

in order to be able to review the literature of any scientific subject. As a new subject a language is difficult to teach and I should never think of advocating teaching one in an Agricultural College unless the student came in already prepared as far as the matriculation standard. French or German should be one of the qualifying subjects of those going into agricultural science.

The above are, very briefly, the major subjects which should be taken up in agriculture. When one looks at such a curriculum in detail, it is rather an appalling list and one of the great difficulties in our courses is that relatively there are too many subjects, but how to get over this great obstacle I do not know. It is difficult to give a student a very large number of subjects at one time, though all have a bearing and each instructor and professor naturally thinks his subject is the one which should be given the most attention, but the result of combining these is to get the best possible compromise that we can.

How are we going to combine the science, practical, and cultural subjects in our degree courses? The practical man who has been brought up on a farm and who is acquainted with animals, has the greatest difficulty with the science subjects, and the men who have not had any training on the farm, or who come from the city homes, usually do better in the sciences. You often get a good practical man who is weak in his educational attainments, and you do not know what to do with him. Queen's University has solved this problem by admitting adult students to their courses, (if they are over 21 years of age, even if they have not got ordinary matriculation requirements) but they take very good care that if such a man does not do well on the first year's subjects, he is not allowed to go

further, and thus they are able to help a number of men who otherwise would be disqualified from taking courses.

The men with least practical knowledge often do the best on science subjects. Therefore, when you are mapping out your course, you have got to remember that the science trained men must have sufficient of the practical subjects to be able to deal intelligently with the farmer. Take one example: Suppose we have a man who is qualified in Vegetable or Plant Pathology, if he has no acquaintance at all with agricultural practices, he might give extremely foolish advice to a farmer seeking information, and therefore it is necessary for such specialist to have some practical training. It is best to put the major part of the science subjects in the first two years, at the same time adding sufficient practical subjects to give the non-practical man a sufficient acquaintance with the practical, and to give the practical man a scientific knowledge of these subjects so that he will not lose sight of them and will not be disgusted with the tremendous amount of science put before him.

In the third year allow a certain amount of specializing, picking out those subjects which have the most to do with the special option that the man is taking. For example, if a man is taking Horticulture, then naturally he has to have a larger and more intense training in Biological Science, particularly in Botany and Plant Pathology. Therefore, these subjects would be featured in the third year and also in the fourth year.

Again if a man was going in for Animal Husbandry, he would be asked to give more time to Veterinary Science and Animal Breeding. By allowing your specialization to commence in the third year, you are thus able to concentrate it

more in the fourth year, and devote more time to the special subject which the student is going to make his life's work.

Further, I suggest that more than a pass standing should be expected of a man who specializes. (By pass standing, I mean from 33 to 40%). A man who wishes to qualify as a specialist should have a course equivalent to an honor course and should be expected to make a high standing; I am not prepared to say how high that standing should be but it should certainly be considerably higher than 40%, the pass mark that is usual for the ordinary examination.

No College can be expected to graduate first class specialists in four years, even with the best staff that it is possible to gather, for you cannot turn out real good specialists in four years. You can give a man a good start and you can say his training has been along the right lines, and you can train him in the direction of his specialty, but after all he has got to do postgraduate work either at a College or by self development. If it is all possible, the graduate should obtain further knowledge and experience as soon as possible, not necessarily in the institution from which he graduates, but, if possible, and if he can afford it, at an institution which offers the work that he desires, and which is well equipped in men, laboratories and equipment.

I have only time to outline a few of these things and I am afraid I have passed the time allotted to me. In consenting to speak on this subject, I suggested that a discussion should follow and trust that this suggestion be followed.

Discussion.

Mr. W. A. BROWN: I believe from an academic standpoint that the question of world marketing, the supply and demand of dif-

ferent agricultural products, and everything that helps to make agriculture profitable, should have a place in the curriculum of an agricultural college, and I would, therefore, bring to the attention of this body the very great need in all our agricultural colleges of paying more attention to the question of markets and marketing.

Prof. CROW: I should like to ask Dr. Harrison whether he considers it impossible to turn out high grade specialists or whether he thinks it not desirable in our present stage of agricultural knowledge?

Dr. HARRISON: I think the time has arrived for it. The course I have outlined starts them in the line in which they want to go, but I certainly think it requires a longer time than four years. I should give students special training in the third year and fourth year, a good grounding in the first two years, and require higher entrance requirements than we have had heretofore in the majority of agricultural colleges.

Prof. CROW: We should first remember the kind of men we want to turn out. That point being determined, the next point is this: We recognize that in order to turn out men as specialists in Animal Husbandry or Field Husbandry, they require a special knowledge of their subject, and the problem seems to be one as to whether or not these men are to receive a scientific training which will be effective other than practical training, or whether they should later take that, after having secured their practical training. It seems to me that if I were in a college and taking up a special line, I would first take up practical subjects, and have these co-ordinated so that they would follow along in about the same line.

Mr. T. K. DOHERTY: During the war a Council was appointed by the Government with a mem-

bership of ten or a dozen expert men to study the educational system of Belgium. In that country every student has to spend half his time on practical work, but the question arose of organizing higher educational standards at the University of Versailles, and the great majority of the council decided favorably on the study of pure science during the larger proportion of the four years course, and further decided that the entrance requirement should be very high.

DEAN E. A. HOWES. I am keenly interested in the subject under discussion as one who is trying to lay the foundation for a new institution, and during the year I have been corresponding with the leading institutions. I just wish to say I have followed this paper with very keen interest. I must say that the information I have received would bear out what Dr. Harrison has said. I would like to see the question of the admission requirements discussed. It has been a burning question with us in Alberta. I think we are talking specialists too much. There are so many institutions, when they come to postgraduate work, that will not recognize students from institutions where proper matriculation entrance is not required at the beginning, or where the privilege is given later on to cover deficiencies.

President J. B. REYNOLDS: Dr. Harrison has given us a most admirable survey of the situation. I only wish to comment on one phase of it, namely the entrance requirements, and perhaps this will interest Dean Howes. We all recognize that Canadian, and I believe many American institutions, co-called agricultural colleges, have failed to distinguish between the function of agricultural schools and of an agricultural college. I believe it is being done at Macdonald and in Mani-

toba, and quite recently in Ontario — the entire separation of the school of agriculture from the Agricultural College, a separation recognized at the entrance and in the entrance requirements, so that we have a school of agriculture apart from the agricultural college? Now the question is shall these agricultural schools be recognized as preparing men for admission to the agricultural college? Shall graduates of the agricultural schools be admitted to a course in the agricultural college, or on the other hand, shall the agricultural school be considered complete in itself, and will the work be left in its own hands entirely? I have my own conviction in the matter, and I should like to ask Dean Howes to elaborate it a little further.

DEAN HOWES. I have been keenly interested in that side of the work, and the relationship between schools and colleges. In most of the States of the Union, I found that the work of the schools was separated entirely from that of the university. I found in one or two cases they were given recognition where the work has been carried on for sometime. The dean of a college said to me, "I think you have done well in Alberta to give some recognition to the boys coming from the school, and to give them some credit for the work done there when they enter the college, because we are losing boys right along; boys that had no intention of getting higher education when they entered the school, but they ought to be given some credit for their two years experience." I think it is desirable that nothing should be put in the way of any young man who achieves the ambition during his course in the lower school, from entering college. I realize the danger in a way, and I realize that the work should be carefully supervised. I cannot say much from experience in Al-

berta except that the men sent from the schools have been outstanding men. It is true in 20% of the cases that lack of entrance requirements showed itself lamentably all through the course, and I think some arrangement will be made by which the work must be gotten up during the first year.

I think we should raise the standard of entrance requirement with the modification that we might deal with the older man when he comes in in a special way. There are reasons why I do not wish to discuss certain relations in that connection.

Mr. W. J. BELL: I was going to say something a few minutes ago, but I am not going to say it now, for the simple reason that President Reynolds has asked the question that I was going to ask. I believe the tendency in our agricultural colleges in the past was not to give the ordinary farm boy, who is going back on the farm, a fair show. A great many of the men are plucked at the first year's examination, and that is not fair to the boy. Many of these boys have an opportunity to study agriculture from the practical standpoint, and they get a great deal of information that will be of considerable value to them on their own farms. As Principal of the Agricultural School at Kemptville, I would like to see something done in Ontario that would enable our students who have proper standing to go to Guelph or to Macdonald College or to any other college they desired to go to on graduation from our institution. I will guarantee that these boys have been given two years of real instruction in practical agriculture, and when they graduate, they will be very much more use to themselves and to agriculture in Canada than they would have been if given the course that is at present given in the agricultural colleges. The whole trouble is that

we are looking constantly to graduating of students and not to making of practical agriculturists. At our school, we are trying to get the young fellow at the end of the second year, up to a certain standard so that he can go on and complete the third and fourth. It seems to me that the farmer boy who is going to be a farmer is not getting the opportunity he should get.

THE CHAIRMAN: Time will not permit of a more extended discussion on this subject. It is not very often that one finds himself in such complete accord with the speaker, not only in the policy laid down but in the illustrations as well, as the Chairman finds himself in the statements made by Dr. Harrison. The two ideas that have been advanced have unfortunately not been kept separate and distinct heretofore, with the result that what Mr. Bell has said with regard to training given farm boys is perfectly true, and what has been said by the other speakers with regard to the opportunities given men who wish to proceed to their degree and those who wish to take postgraduate course is quite true, so we must remember the object we have in mind. If we have in mind a course in an agri-

cultural college leading to a degree, there is no question in my mind but that the way to do that is to first require Matriculation standing for all students who wish to proceed to the degree. The next point is to lay stress on the basic sciences and couple with that just as much of the practical work as is possible. The courses which have been evolved in the University of British Columbia are very much similar to those outlined by Prof. Harrison, except that he has outlined one idea which I consider an admirable one, namely, that a course in teaching should be given. Then he said, if you make the standards higher, you will rule students out. We have not gone after students; we have not very many it is true, but just now we have more than we know how to take care of. There are those who are always fearful when you talk of raising the standards and lengthening the course and increasing the fees, that you will shut out a great many students. No doubt you do shut out many, but the general experience so far as I have been able to observe is this: that as soon as you raise the standard and lengthen the course and increase the fees, you have more students than you ever had before.

AGRICULTURAL EXTENSION WORK IN CANADA.

GEO. A. PUTNEY, Department of Agriculture, Toronto.

The place given extension work in the programme of the first meeting of Canadian Technical Agriculturists will not, I hope, convey to the general public the relative importance with which we view the extension work as compared to other efforts in the interests of agriculture.

Extension work, as I understand it, embraces all methods whereby knowledge in agricul-

ture is imparted to the practical farmer and his family in his own community, — production, business, home-making problems and community effort. The methods include publicity, literature, lectures, demonstrations, discussions, illustrations and experiments.

The value of scientific research and practical effort in agriculture depends upon the degree to which the results are made the

common property of the farming community. We have paid too little absolute and relative attention to extensive work in agriculture, throughout the Dominion. Our efforts have been largely spasmodic and not based upon any definite, well-grounded plan. The best that we have in research experiment, practical work, business methods, teaching (demonstrations, lectures, illustrations)



are so far ahead of the general practice, that we might well consider the wisdom of devoting some considerable time, effort and money to formulating plans for an aggressive policy in extension work, so that the best that the leaders in agriculture are certain of may be a matter of common knowledge. The great majority of us can well afford to ignore the indefinite and uncertain until that which is well established is made a matter of common knowledge.

May I be permitted to present a view regarding this very important work which I am quite willing that you shall accept as a question for discussion. Without wishing to belittle in any way the importance of the experimental and investigational work and the giving of instruction to regular course students in our agricultural colleges and schools, I beg to give expression to the conviction that the best interests of agriculture, so far as the immediate results and the future of the

industry are concerned, could best be served by diverting a considerable portion of available funds if it is necessary to carry on a comprehensive campaign to make the common property of the whole body of farmers throughout the Dominion the unanimous conclusions in science, experiment and practice along agricultural lines. While there is much to be gained by further experiment, investigation and research, the essential, to my mind, at the present time, is an earnest effort on the part of all concerned to first inform the farming public as to what has been accomplished under ordinary farming conditions and to convince them that there are better methods than are generally practiced. Then by publicity, lectures, demonstrations and examples give information as to approved methods applied to local conditions and possibilities.

The value of centres for education and experiment in agriculture was not generally appreciated by the farming public until lecturers and demonstrators were sent throughout the rural districts to tell of what was being done by the experiment stations and agricultural colleges and successful practical farmers. This system was doubly beneficial, for it not only placed the work before the public in its true light, but enabled the directors of experiment and teaching to adjust their courses of study and lines of experiment to more nearly meet the needs of the farmer. The keen appreciation of the value of publicity and field work has resulted in the establishment of extension service departments throughout the United States. At the present time there are only thirteen states which are conducting Farmers' Institute work independent of the agricultural colleges. Thirty-five have special officials in the agricultural colleges which are direct-

ing the Institute work, while all States have officials in charge of agricultural extension service.

Time will not permit a review of the diversified methods and, to a large extent, spasmodic efforts which have characterized extension work throughout the Dominion. May I be permitted to draw some lessons from Ontario, with which I am so well acquainted, and which was the first province to introduce what we thought at the time was an advanced policy in agriculture? It is a great satisfaction in going throughout the province to learn from this farmer and that farmer, who is looked upon as a leader in his district, that he first received his inspiration to adopt new methods and to strike out along new lines,—to have an ideal in his work, as a result of lectures delivered by the leaders in agriculture in the early eighties and nineties, a staff which embraced some of the leading farmers of the day and the professors and instructors at the Agricultural College and Departmental officials, both Dominion and Provincial; or, it may be that the farmer was impressed and influenced with an article in one of the agricultural papers, or local press. We must recognize that the extension work of the earlier period, which was confined largely to Farmers' Institute meetings, the press and the publications from the Department of Agriculture, accomplished much for agriculture.

In Ontario, and it may hold true in some other provinces, there has not been that close co-operation and co-ordination of the various forces that is required in efficient effort, and one essential to effective field work is the establishment of a definite broad policy where co-operation among all interests, both Dominion, Provincial and Inter-provincial, can be effected. I trust that one

result of this Conference will be the formation of a strong Committee to give full consideration to a get-together policy, whereby the practical farmer, the government official (director, teacher, experimentalist, instructor, the Farm Journal representative, market interests and business men may formulate a comprehensive policy whereby agriculture may be stimulated and developed to its full possibilities in this country of such wonderful resources.

So far as the staff, the message and the method of presentation are concerned, extension work has unlimited possibilities.

The Staff.

The staff includes not only the professors, instructors and demonstrators at the Agricultural Colleges and Experimental Farms, but also a large army of field men, chief among them being the agricultural representatives. We must not overlook the fact that the farmer who faces the practical, every-day problem must always be an important factor in extension work. The instruction staff should include a goodly number of successful farmers who keep themselves well informed on up-to-date methods and the latest in investigation and experimental work. The farmers of the Dominion have made wonderful advance, and the speaker who undertakes extension work must be prepared for something beyond generalities and must be able to give the last word in the particular lines for which he is advertised. While it is in most provinces impossible for the regular members of the College staff or Experiment station to give any considerable time to field work, it would be well for those in authority to consider the wisdom of adopting a plan whereby the men who are responsible for teaching and experimental work will be

able to spend at least a limited amount of time in field work, giving instruction, investigating methods practised by the farmer, and getting the farmers' viewpoint on the particular line to which the individual concerned is devoting his time. There must be a closer linking up of the teaching and experimental with the field work if we are to meet with the greatest measure of success in the experimental, investigational, teaching and field work.

Those who are to undertake field work should come together in conference for the purpose of exchanging views, deciding upon the feature to emphasize, discussing methods of presentation, choosing illustrative material, etc.

The Message.

There is no lack of reliable information of great value which is not yet possessed by the great bulk of the farmers, and there are many methods and underlying principles, the value of which cannot be disputed, but which are not believed, or fully appreciated by the farming public, so our message should be a statement of fact and the setting forth of underlying principles, presented in such a way as to secure the confidence of the average farmer. We have the principles underlying cultivation, the matter of ordinary cleanliness in the production and handling of milk, cheese and butter, the value of the pure-bred sire, which is not a scrub, seed selection, and many other fundamentals which have not yet been exhausted in our propaganda work. The difficulty is not to find subjects upon which to base instruction, but to make a wise selection and to adapt the instruction attempted to the needs and possibilities of the district concerned. Greater production should be one of our watchwords, but we should emphasize profitable production. Business in

agriculture should be a matter of advice by the government, but the conduct of the business a matter for action by the people themselves.

Method of Presentation.

There is a time and place for the lecturer alone, but in the great majority of instances in our extension work the effectiveness of agricultural instruction depends upon the illustrative material utilized. Charts, stereoptic views, moving pictures, models of buildings and equipment, samples of produce, can all be used upon occasion to very great advantage. The Women's Institutes of Scotland, which have been modelled largely on Ontario methods, have introduced a plan in their Institute work which proves very effective. They aim at each meeting not only to have something to hear, but something to see, and so far as possible, something for each person to do; and if we could so plan our gatherings for instruction in agriculture that the spoken word would be supplemented by impressions to be received through the eye, and still further strengthened by the individual taking some part in the proceedings, I am certain the effectiveness of our efforts would be considerably strengthened. We now have a fund of illustrative material in the way of statistics, surveys, cost accounting, drawings, photographs, stereoptic views, moving pictures, etc., bearing directly upon the province of the farm. Wherever an opportunity is afforded by which the producer can compare his product with the best of the district, the country or the province, the lesson is made all the more impressive. Teachers, field men and the practical farmer should get together and formulate plans for making the field work most effective.

I hope I have not left the impression that the salvation of the

farmer depends wholly upon the quality and amount of publicity work, the value of instruction by lecture and demonstration and the practicability and reliability of experimental work. These are factors, and very important factors, but the essential in all advancement is to direct and encourage the people how best to help themselves. The greatest service which one can render to the practical farmer or the home maker is to encourage initiative, the utilization of local talent and resources, and the active co-operation of all residents in the community. Encourage the farmers to discuss their own problems in their own way. In Ontario, as in most of the other provinces, we now have local organizations — Farmers' Clubs, Women's organizations, Girls' and Boys' Clubs, Junior Farmers Co-operative organizations, etc. Through proper direction by the provincial and local officials of these organizations and the co-operation of the Depart-

ments of Agriculture and other departments of the Government, the extension work of the Department of Agriculture should become much more effective.

If effective work in agriculture is to be done, we must have permanent local organizations; and these should be unified through district organization.

While there is still a demand for a limited number of general agricultural meetings, where gifted speakers, well fortified with practical information and scientific facts, can create that interest and enthusiasm which is necessary to stimulate local effort, the major portion of future effort will naturally be a response to requests from local organizations which have been considering their own problems in their own way and feel the need of advice and assistance from outside sources by those who are recognized as leaders in the particular line or lines under consideration.

THE BASIC PRINCIPLES OF THE SOCIETY, WHAT THEY MUST BE, AND WHY NECESSARY.

Professor H. BARTON, Macdonald College.

I want first to thank you for the honor you have done me in electing me Vice-President of this



association. I assure you I regard it as an honor and I appreciate it. The President has been able to

offer some explanation for his appointment; mine is still a mystery.

The whole purpose of this society is collaboration and to the extent is collaboration operatives in the activities of this society it seems to me will success be measured. It seems strange that this should be the first effort of scientific men in agriculture to effect an organization. They have had much to do with organizing other societies. Farmers are organized, boys and girls are organized. I believe there is a certain resemblance between ourselves and the unprogressive farmer who has been so busy that he has had no time or interest for his organization. I hope we shall not find

many of his peculiarities within our ranks. We have called him independent, stubborn, selfish, ignorant, and very many other things. His activity has been in the field of criticism and he has been loath to subordinate his interest to the welfare of the majority. We are now placed in what we might call the co-operative balance, and it will be interesting to see how we weigh up. I want, therefore, to lay down as the first basic principle of this society the fullest realization of co-operation, I do not know that I need dwell upon it.

I have no instructions as to what to say, and I don't know that anybody knows what I am likely to say. I believe this project of ours demands a clear perspective; we have got to get that. Our great objective has been stated as the advancement of agriculture and I believe that is right in its truest sense. I believe that if a retrospect were taken for a ten year period or a 20 year period, that while we may recognize that some good and some far reaching work has been done, yet we are not entirely satisfied with the progress. It is because we are not satisfied with the rate of agricultural advancement that this meeting has been held, that is why we are here. If we are satisfied with it then this meeting is a mistake.

I want to divide the advancement of agriculture into two parts. I am going to call the first one Agricultural effort. We have an immense amount of machinery, we are spending huge sums of money, and we have a different problem today to what we had ten years ago. Apart from individual features the machinery has developed along the lines of least resistance. It is something like Topsy, it just grew. One of the reasons why we are not getting further and going faster is because we haven't got co-ordina-

tion within our effort as a whole. It has got to be a mutual affair, and I don't see how we are ever going to make full headway on any other basis. I was glad to hear Mr. Brown this afternoon point out the importance of giving a place in the college curriculum to the question of marketing. This is only one of many illustrations of the need for co-ordination. I have made an effort to keep in close touch with Ottawa activities, but I feel as a teacher I should be more familiar with the work that is being done there.

The other point I want to mention is the improvement of the status of the agricultural profession. It does not enjoy the status that it merits and demands. I think this society should recognize the question of financial remuneration. The average man in this profession does not even receive a wage, he receives what might be called an allowance. Before the war it was possible for the average man in agriculture to live, to dress respectably and to have a little amusement, to carry a little insurance, and to meet his doctor's bills, and if he did not have too many doctor's bills he might buy his reading material and do a little travelling, and all of these, on a modest scale, I believe are indispensable. I don't believe that programme is possible today for the average man in professional agriculture. He does well today if he lives, and then only if he has a careful wife. I believe many of us would have succumbed long ago had it not been for our wives. I don't believe it is any exaggeration to say that the average professional agriculturist is in constant worry about his finances, and I defy any man placed in such circumstances to do his best work. I want to make it clear that I do not regard this as a union movement, but I believe that through this society we will be able to

place the facts where they ought to go. I believe that in the past we have been too modest; our modesty has been commented on today by several speakers.

I believe it should be the province of this association to inspire and encourage a higher academic attainment. Research should be one of the immediate objects of this society as a means of bettering the profession. I think the time has come when we want work of a different order, and of a higher order than our work has been in the past. As a teacher of advanced agriculture I have had to depend on American literature; we have been in a sense a suckling of the United States for advanced material. Dr. Harrison and President Klinck both referred to higher research work. Its importance cannot be too greatly emphasized.

I have regretted more than once that I have had no training in pedagogy. I have seen the need for it, and I believe it is extremely regrettable that our men who have gone into the field of instruction have had no training in the art of teaching.

We all know that these things that I have mentioned will take time, and will make a severe test of our co-operative spirit and appreciation. It looks to me as if our proposition is not unlike the average farm proposition. Our results will be slow but cumulative. I do not anticipate anything spectacular. I am looking for slow, and perhaps small financial returns, and I realize that many of the problems that we attempt to deal with will lend themselves only to gradual treatment and gradual solution; on the other hand I think there would be great danger in regarding this association as a hobby. I think the sooner we can justify our existence the better, and unless we are aggressive we will die. I don't be-

lieve the association is something that should be put aside after this meeting.

There are two vital things upon which we should hinge our work. In the first place we must make definite provision for continuation work, that means the time of someone. It means a paid official. In the second place we must make our ideas and our activities known. Publicity is the life blood of every such society as we have formed here. Whatever form it may take it should maintain the dignity of the society, and it should be a creditable production. It should serve the purpose of disseminating technical information, and also as the organ of the society. I would also emphasize the importance of local organization. It is not necessary for me to say that as a society we have a non-political policy, my idea would be that we favor no government and that when necessary we spare none. I have nothing revolutionary in that idea, I merely put it in that way as an expression of the courage of our convictions. There are things that require being done and I think this society can serve as an instrument to accomplish them. I hope this convention will result in something concrete. I look for business and I hope we will accomplish something definite.

Discussion.

Mr. F. C. HART. On the point of co-ordination, we all know that various theories and statements go out to the farmers from different sources, and that is discouraging to the technical man and certainly disadvantageous to the farmer. Would it be possible for this organization to be a clearing room for technical information? Before the technical man comes out with any information it should be placed before this society so that it could be seen whether it

agrees with the opinion of others in the same department. The expert at Ottawa might say one thing and the expert of Guelph another thing.

THE CHAIRMAN: I think it should be possible to co-ordinate the work of local stations without going through the society. The idea advanced by Mr. Hart is one that should be taken into consideration. We have all experienced the very difficulty of which Mr. Hart has spoken.

PROFESSOR CROW: Is it within the province of this society to lay down a general broad policy covering all phases of agricultural organization for the Dominion of Canada?

PROFESSOR BARTON: That is about the sum and substance of what I was driving at.

Dr. C. E. SAUNDERS: Someone was discussing the teaching profession in one of the Western Provinces and made the statement that if the teachers had more self respect they would get higher salaries. Another said: That if the people had more respect for the teachers they would give them higher salaries. It seems to go round in a circle. Men trained for research work are always badly and inadequately trained. I do not think there is a man who has begun agricultural research work who was fit for the job. I do not think there is a man in agricultural research work today who is fit for the work, except those who learned it after they received the appointment. As the matter stands today, nearly everybody is shockingly underpaid, and the public are to blame. To my mind the point is, how can we make the public appreciate our efforts and our worth? The term agricultural science is a little vague. There is an agricultural science in coming in contact with the farmer and persuading him to use better meth-

ods. There is agricultural science on the agricultural farm. The salary question is one that should be taken up by someone who is competent to deal with it. Professor Barton says that the object of this society is for the advancement of agriculture, and that is true, but we can accomplish that only by setting ourselves a definite goal, and when we have accomplished that then we should go on to something else.

DR. J. H. GRISDALE: I have listened with a great deal of interest to the discussion, and I must say that there has been a vein of pessimism that I do not like to see. It has been a case of knocking ourselves and knocking the public who employ us, and I maintain that we would go at these things in an entirely different way. I say we have every reason for optimism, and we have every reason to hope for a great future for this society. I would like to say to the young men here, many of whom have been in the work but for a short time: Do not let yourselves be carried away by a wave of pessimism; don't let yourselves feel that because one man goes back and says that for ten or twenty years he can see very small progress made in agriculture, that no progress will be made in your life time. I can remember agriculture for forty years in this country and let me tell you, gentlemen, that there has been progress made, and in the next forty years I venture to say we will not know this country agriculturally. There is a great future for everyone of us. Our object should be to make this science a real science. If we spend our time at this convention telling each other how much we are looked down upon and how little we are paid, the young men of the organization will go away feeling that we are a bunch of pessimists and they will not want to have

anything to do with us. That is not the way to make progress and to strengthen our society when it is formed. We can make of this society just what we will. Let me tell you that I have associated with the farmers of this country for fifty years. I was born and brought up on a farm, and I have lived with farmers all my life. If I was not farming I was teaching school among the farmers and if

I was not teaching school I was carrying on experimental work, and I am not afraid to say that the majority of the farmers of this country are not such as have been described. We want to look upon the farmer as our co-worker and as a man who will back us up in our work. There are men who are willing to knock us a little bit here and there, but they are in the minority.

FIELDS OF EFFORT FOR LOCAL ORGANIZATIONS.

DEAN HOWES, University of Alberta.

Mr. President and Members of the Canadian Society of Technical Agriculturists:

I am in the position of one having had a subject selected for him—probably not a bad idea by the way. The Organizing Committee to whom we owe so much for careful and unselfish work performed during the past months, felt that the question of local organizations should have a definite place on the program of our first Convention, and in this I feel that good judgment has been shown, but differ from them in their choice of a victim. However, theirs be the responsibility.



I am strongly in favor of one central organization of such society as the one here met in Convention. There are so many ques-

tions and problems so broad in their significance and interest as to demand consideration by representatives from every Province met in one Convention. I need only cite the problems relating to agricultural education in our different institutions for the purpose, or the problems relating to research and the maintenance of definite integrity of action and purpose in the conduct of this research work, or questions pertaining to the curtailment of unnecessary duplication of effort such as between Federal and Provincial departments. I could easily name many other sets of problems obviously of nation-wide significance which can never be solved by local effort alone. Also there would seem to be much reason to contend that the official centre of such an organization should be in our Capital City, and in closest touch with our Federal Department of Agriculture, even though some of us be forced to travel almost across the continent to reach that Capital. The importance of the work involved may well justify the difficulties incident to the maintenance of an organization built for service to a country as far-flung as ours. As a side idea we must not forget the value of such long trips, to some of us at least,

in the added sophistication thereby attained.

Thus, sir, having cleared myself as to the faith that is in me in regard to the all important place a national organization must occupy I am in a better position to submit to our delegates for their consideration two suggestions:

1. The necessity for eastern and western branches of our Society.

2. The advisability of inaugurating Provincial branches of our Society.

I shall briefly discuss these in the order given and I hope any discussion that may follow will recognize the distinctions involved in the two proposals.

I hereby respectfully submit:

1. Eastern and Western Branches.

With the type of men here gathered together it is scarcely necessary to plead for a consideration of this problem on its merits, and in a scientific manner and without preponderance of sentiment. So often we hear that the relationship between East and West is a delicate question and must be handled with gloves. I have no sympathy with this idea. There are no differences that will not stand the light of public knowledge—none that straight-forward word between man and man cannot remove and history does not show me that the method of the gum shoe and the silky paw has ever accomplished as much. We, met in national convention, may as well frankly recognize that there exists a definite East and West in this country of ours with their own problems and interests and that for the more frequent consideration of these respectively it would be of interest to maintain two tributary branches. This does not presuppose lack of interest on either side, for reports of progress would be exchanged at a Central Convention. Speaking for the West I would call attention to the

fact that for the present at least nearly all of us come from the East and we assume our boyhood recollections have not died in us. As a concrete manifestation of the survival of that interest I submit to you what other impulse would move us to have the monotony of the trip across the "land debatable" east of Winnipeg? Then too, we feel that more and more the wise agricultural men of the East are showing interest and constructive interest too, in what we of the West are facing. Since coming to Alberta I have looked forward to the annual visits of the heads of the different Federal branches, with interest, because of old personal friendship it is true, but also because of definite help received in the way of information, advice and encouragement. But enough has been said to indicate the bond of sympathy and common interest between the Technical Agriculturists of East and West.

Granted all this, we still have to face the fact that to a great extent we have two different sets of problems to face and I submit that these are best met on the ground where they exist and by the men handling them. At a national convention the time is limited and it is scarcely fair that the man coming all the way from Saskatoon should have part of his time taken up listening to the discussion of problems that can technically never be anything but of indirect interest in his time and place. Then too there is the question of distance which must be faced. Granting the necessity of a national organization I plead for the inauguration of Eastern and Western branches for the reason of more frequent meetings at less cost of time and money. How would it do as a basis of discussion to suggest that the national organization convene annually but that Eastern and Western

branches convene at least each year as well? I have not forgotten the different sets of problems to be faced in British Columbia. Anyone who has sat for months on the Soldiers' Settlement Board need not be reminded that once at least British Columbia was a law unto herself. I prefer to leave it to the delegates from that Province to state whether they would feel like joining with the Prairie Provinces in a Western branch if for geographical reasons only. I think I can speak for the Prairie Provinces when I say we feel that the establishment of a Western branch would be in the interest of more progressive work. We cannot feel that this is in any sense a segregation of interests but rather a place for an opportunity of clearing up home problems, report of which would be brought to the parent organization.

2. The Inauguration of Provincial Branches.

One justification for this step is to be found in the further development of the idea of the extremely local nature of many of the scientific problems with which we are confronted. Each Province must inevitably present its own problems of soil, plant and live stock. I can best illustrate this by a concrete example and you will pardon me if I cite one that is of paramount importance in the Province I have the honor to represent. Our swine growing industry is a large and rapidly developing one. Most of us knew something about raising hogs in older States and Provinces but in Alberta we find ourselves confronted with new conditions which we are far from having mastered. Let me deal with one condition alone — every year there is a heavy loss caused by the fact that a large percentage of the young pigs are born in a hairless condition. It has been stated that in one year the loss approximated

50 p.c.; how nearly correct this estimate may be is of secondary importance to the fact that the loss is a very serious one. We are working on this problem at our College having just completed our third winter of experiments with the feeding and housing of breeding sows. We have used about fifty sows each winter for this purpose alone, using three breeds, and as far as possible, litter mates. We are far from having solved the problem although we have made some progress and have rather tended to disprove some of the popular theories as to housing and feeding. We are now working on the possible connection between the condition named and the all too prevalent goitre. I may state we are studying the question of iodine content in the food and are co-operating with our medical men in studying the goitre contingency. But enough of this, which is not a report on an experiment but is intended to illustrate the fact that each Province probably has its own serious scientific problems which should demand more frequent discussion and study than the annual Convention of Technical Agriculturists offers or even than that offered by the meeting of an Eastern or Western branch.

Another consideration, possibly only an argument in favor of the suggestion just made is that Technical Agriculturists in each Province have facilities for meeting that do not obtain in connection with meetings out of the province. I do not refer to distance alone, although that is quite a consideration, but to the fact that so many Provincial officials travel throughout the Province as a matter of course and that meetings for scientific discussion can be arranged coincident with regular official duties. That this has not been done in the past as much as could be desired is no argument against it, for I feel that one effect

of this parent organization will be to foster and give impetus to just such effort, for we must look to this parent organization to hold up the ideal and to consequently guarantee the integrity of the work of the tributary Provincial organizations.

Another reason for Provincial effort is to be found in the necessity for the securing of Provincial Government assistance and encouragement. This can never be secured through the parent organization. If the Provincial Government gives assistance to scientific work it will be first of all to work of more or less Provincial service and we may as well face this fact but in so doing we need not forget that it is all a contribution to the good work of the whole Dominion. It might also be pointed out in passing that often our work as agriculturists is hooked up with other work not directly agricultural and my idea is that the Provincial Government will more readily support such joint effort to the good of all concerned.

I have with intent, confined myself to two definite suggestions. Well meaning friends have often intimated to me that I try to cover too much ground and for once I have yielded to their advice. We teach agriculture in our High and Public Schools and I can see great value in Provincial organization of teachers of these two institutions for the study of their own particular problems. These teachers may or may not be recognized as members of our National organization but I can see reasons for the said organization interesting itself in their problems and difficulties. However, this may come up later and for the time at our disposal we will find that the discussion of the two suggestions submitted will furnish us with plenty of material.

Sir, I respectfully submit the foregoing with the hope that any

part that meets with the approval of your Convention will be given force by definite steps looking to such organization as shall be deemed wise.

Discussion.

Mr. PUTNAM. I think the National Organization for Women's Institutes would illustrate the point under discussion, and to show how organizations may be linked up with the parent organization. We look to the parent organization of Women's Institutes as a sort of clearing house and not an organization in itself that is going to do much. Every organization will get information and advice from the parent organization. We have standing committees on Health and Better Schools and Education; the Health Committee of the Women's Institutes is not going to undertake health work, but the Chairman of that committee links up with the Chairman of similar committees in each Province, and the Chairman of those committees, again links up with all efforts along health lines in the particular Province, and links up with our Medical School Inspection and with the Victorian Order of Nurses and with the Provincial Boards of Health, so that the Provincial Committee of Health, which is under a person acquainted with all its activities, is in a position to stimulate interest in health work in the Province. Any information which the Dominion organization secures is passed on to the Provinces.

With reference to the Eastern and Western sections of the organization, I think it certainly would be well to have such a division. There is no indication that there is a lack of interest in the West in what is taking place in the East, but we all have our problems, and the Western men want to deal with certain features that the Eastern men might not want

to deal with. In the Province of Ontario we have more condenseries and milk supply factories than any other part of the Dominion. Last year we made something like \$11,000,000 worth of milk powder and condensed milk. I think where the National Dairy Council has failed is that the Central Organization has taken too much in hand without referring to the local organizations.

Dr. CHAS. SAUNDERS. The American Society for the Advance-

ment of Science is divided into various sections. Chemical Section, Bacteriological Section, Medical Section, Physiological Section and so on. You might divide this Association into various sections in the same way, and have the various sections meet at the same time as this society meets; that would be very much better for this society because the different delegates would be coming for their own sections and would stay over for the larger meeting.

THE BASIC INDUSTRY AS SEEN THROUGH URBAN EYES.

TOM MOORE, President of Trades and Labor Council.

Mr. President, Ladies and Gentlemen: It seemed to me in looking over this audience that the farming industry is somewhat similar to the ordinary city industries inasmuch as whilst it embraces in its ranks many women workers, the men think themselves fully competent



to represent the women and their views. Otherwise I feel sure there would have been a greater number of ladies present on this occasion, because if there is one feature of farm life which perhaps deserves more attention than another, it is the position of the women workers on the farm.

When I was requested to address your Convention, I was at the same time given the subject of

my address. Therefore, I do not want to take any responsibility for the title. Before dealing with that question, I would like to compliment the organizers of this Conference on the good work they have accomplished in bringing together so many men from the different parts of the Dominion. There can be no doubt in anybody's mind that the tendency of modern times is away from individualism towards collectivism. Some people always fear any form of organization. If they see capital organizing they think it is going to be for the suppression of the people; if they see the workers organizing they dread that the workers are going to use their power to the detriment of the rest of the community. No doubt there are many who view with trepidation the organization of Technical Agriculturists, probably thinking that an organization of this kind will ultimately be used to the detriment of the farmers themselves.

Anybody who views the problems of today with an open mind must welcome an organization of your nature, and they should welcome the organization of all classes of the community. Organization does not necessarily mean conflict.

Organization in its purest form simply means progress. I believe that if you can succeed in organizing your section of the farming industry, the influence which you can bring to bear upon the farming life of this country will do much to solve many of the problems which are today facing us.

Referring back for a moment to the title of the address which I am to give you, the question of "The basic industry as seen through urban eyes," I do not suppose that the organizers of your convention for one moment had any doubt in their minds as to what *they* meant by the basic industry, and they probably gave some thought to the changing position of farming in this country from what it was ten or twelve years ago. I do not intend to trouble you with any statistics, but it may be necessary to quote a few figures from time to time. There is much difference between figures and statistics, because figures usually demonstrate a fact, whereas statistics can be used to prove a theory. The figures of the census for 1911 showed that the far greater proportion of the population of the Dominion of Canada was then engaged in agricultural pursuits, and since that time we have seen very little to change the public mind in that respect. The advertising which is done for immigrants for this country concentrates upon the requirements of farmers for the development of Canada. The problem which faces us so often of the high cost of living brings home to us very forcibly that farming is undoubtedly the great industry of this country, with the result that we usually believe that farmers represent the great proportion of the residents of the Dominion of Canada. The latest figures that I have been able to secure are somewhat later than those gathered at the taking of the registration during the war, and they show that

there are approximately three and a half million adult workers in the Dominion of Canada. The rest of the population is made up of children and women who do not follow what is usually known as work, but follow a far more arduous occupation, that of household duties, people living on their incomes and others who are unable, because of old age and disability to do any work. The working population is about three and a half millions, and of these, it is estimated today, about 34 per cent. are engaged in agricultural industries; about 10 per cent are engaged in buildings industries, and in all there are over 40 per cent engaged in industries other than agriculture; the remaining 16 per cent is made up of distributors, merchants and others of that description. Therefore, when we come to discuss the basic industry, there may be food for reflection in our minds as to whether the conditions in Canada are not such, viewed from the standpoint of the number of people engaged in the industry, that farming has ceased to be the basic industry of the Dominion of Canada.

I am not going to attempt to argue as to whether that is an advantage or disadvantage to Canada. We do know, however, that in this country, there are vast natural resources. We have vast timber limits, largely as yet, in many instances, almost untouched; our inland seas and our oceans to the north east and west of us contain vast resources of foods. Then we have our mines bringing in all the metals which are known to the mind of man. These are some of our natural resources, and if Canada is to progress as a country and do her duty towards mankind, then the Canadian citizen must start to develop not only one portion of her natural resources, which is her vast farming lands, but must in justice to humanity

generally, develop all the natural resources of which she is possessed. It is not sufficient that we should develop these resources just to the extent of turning them into raw material for some other industry; it is not sufficient that we should cut down our pulp wood and ship it as pulp or that we should mine our coal and ship it in its raw state. It is not sufficient that we should take out our gold and silver and other valuable minerals and ship them from the country for development in other lands. If we are to have a progressive country, it is essential that we should so balance our industries that we are able to ship our commodities in their final form. What is true of our other resources is true of our agricultural resources.

In the past Canada has been advertised throughout the world as a country of pioneers, and as a country possessing illimitable fertile plains where wheat can be grown on virgin soil. The average conception of Canada outside of the boundaries of the country is a country which possesses wide fields in which wheat can be grown and shipped abroad, and that we should import stock and other subsidiary items of farm life. That seems to be the conception that is held in England and many European countries, and that perhaps is the fault to some extent of the class of advertising which has been done. There are still great stretches of fertile country that must be brought under cultivation, and for that purpose we need pioneer farmers, but we must also realize that in speaking of farming, we are not speaking only of the pioneers of the West, but that Canada being a country of great distances is also a country of varied conditions, and the farmer exists not only on the western plains but in every other section of the community, from the 45th parallel north and from the At-

lantic to the Pacific. In that great expanse, a territory larger than the United States, we have all degrees and all kinds of farming; we have our fruit farms, we have our dairy and mixed farms, and we have cereal farms. I am speaking as a city man and may therefore not use your technical terms, but what I want to point out is that the average conception given the public is that all farming must be regulated in accordance with the needs of pioneer farms of the West.

Farming only represents today 30 per cent. of our community, but it is also true to say that a very small minority of our entire community is represented by the Western farmer alone. The success of this country depends equally on the successful farming of our Eastern sections, our fruit farms, as it does on the successful farming of our Western plains.

In studying these problems, we must clear our minds of all the arguments which are generally put forward which take the Western farmers as their basis, and see how much nearer we can come to the solution of the problems by taking into account the other great farming sections in this Dominion of ours. One question we have seen discussed very fully in the press during the past years, and that is the question of the ability to secure farm labour for the development of the farming industry. I have read in some papers that it is necessary for the farmers to organize themselves politically and otherwise to resist the improvements which are being demanded by the city workers. A prominent organ of the Ontario farmers recently published an article whereby they treat upon the dangers which would accrue if 40 per cent of our population should be granted an eight hour working day. They talk of the inability of the farmer to meet industrial com-

petition, with the result that there is a great tendency for workers to come from the land and to settle in the cities, and they draw a very black picture. I would like to emphasize to you people today that the two great masses of workers, the industrial workers and the farm workers, the two great masses of humanity who are engaged in useful occupations of producing, cannot live in harmony and cannot progress and make Canada a great country if they are to look upon one another with prejudice. It is only by looking calmly at the situation that progress can be made and a solution reached. There is a possibility of bringing to the farm, conditions which will help to alleviate some of the disabilities under which farming is carried on. Through the research work which you will undertake, production can be intensified until the numerical strength of farm labour will not be as necessary as in the past. There is great room for development of that kind in Canada.

I have not an intimate knowledge of Western farming, but many of you have, and you must admit that the Western farmer today does not desire to any great extent unskilled labour. His investment in expensive machinery and valuable horses is too great to risk in the hands of unskilled labour. The Western farmer today demands a man of high intelligence who can handle machinery and who can handle his investment in a way which will avoid the destruction of that investment.

There is great distinction between the position of the farm worker and industrial worker, and I would like to see the press of this country give a little more prominence, not to the blackest outlook of farm life, but to some of the conditions of farm life which do not exist for the city worker. I believe publicity is given in a

wrong manner. I do not like the publicity which is given to the fact that farming is an arduous occupation, that farming is a life of seclusion and loneliness, that farming means selling your own existence for a mere pittance. That kind of advertising is not such as to bring an influx onto the farms.

Compare the financial condition of the farmer with the industrial worker. The average earnings last year, according to the production on farms, was somewhere about \$1,600 to \$1,700 a year per head of the adult workers on the farm. The figures which were given recently by Mr. Crerar, in the House of Commons, showed approximately about \$1,900,000,000 of production from the farms. Taking these figures as a basis,—I am not speaking of the wages paid but of the earnings per head,—it works out to \$1,600 or \$1,700 per head. Now, taking the figures given by Mr. Scott, a prominent shoe manufacturer, of Galt, as to the Shoe Workers of Canada, we find that last year their average was about \$742 per head. We also had figures quoted of the textile workers of the Dominion of Canada, and it was only \$600 per head. If you compare that with the earnings possible upon the farm, according to the total production, you will see a vast difference. Then if you look at the building industry which is 10 per cent of the adult workers of this country, over 300,000 in number, their average wages, even with 60c and \$1.00 per hour, are only \$1,400 or \$1,500 a year. The farmer of this country, therefore, receives a larger remuneration than the industrial worker for his labor. There are not as many farmers in this country who employ help as there are in the older countries of Europe, and most of the farmers in this country can be classed under the head of farm owners or owner workers who do the work

on the farm with the assistance of their families.

The man who goes on a homestead build a home for himself. I am not going to attempt to quote what the average investment on a farm in this country would be, but I know you will agree with me that if you consider it with the land, there is a considerable investment of actual cash realizable for the owner of that particular homestead. The farmer, therefore, in selling his labor, does not do so with the intention of extracting every dollar that he has earned, but he tries to invest as much as possible, after leaving himself a moderate living, so that that which remains will be assured to him as an investment for the future, and I think it is safe to say that the average man looks forward to, in five, six and seven years, paying back the loans which were necessary to place him on the farm, and to having an investment which will enable him to succeed in later years.

It would be better if it were possible for the industrial worker to do the same thing, and most of the industrial unrest today would be solved if it were possible for the industrial worker, singly or collectively to become possessed of the machinery of production the same as the farmer. It is unfair to compare the conditions of the farmer during that struggling period when he is taking the minimum on which to exist in order that he can provide a competence, and place it alongside of the worker who is taking his entire savings, and using these, and I believe if this was thoroughly understood, there would be a greater desire on the part of many to go back to the farms of this country.

The problem of finance is a great one in the city. We know that too often in industrial life, the condition of the workers is regulated not by their direct em-

ployers but by the great financial corporations who hold the purse strings, and dictate to the employers under what condition they shall carry on their industry. What is true of industrial life is more true of farm life, and too much of the earnings of the farmer has been dissipated in the past in paying usury interest demanded by these financial corporations during his first few years of struggle. If the savings of the city worker could be gathered together by the Government so that they could be loaned to the man who wanted to go on the farm, at a reasonable rate of interest with some security that pressure would not be used at a critical time, there would be more security on the farm, the farmer could secure money at a low rate of interest and the development of farm life would be nearer solution.

Another feature I would like to refer to is the loneliness of farm life. We know too well that the insecurity of employment of the average farm laborer has been such that it has deterred many men from following farm life. It has been necessary for him to leave his wife and children in the city. It has been necessary for him to go as a casual laborer for the season. The accommodation on the average farm is very, very limited, and in many cases it is not what it should be. If the farmer wishes to compete with industrial labor in the city, it is necessary that he should provide better accommodation, and he should build a small cottage on the farm. In Ontario he can secure the necessary money from the Provincial Government at 5 per cent interest, and the loan will be extended over a period of 20 years, provided the farmer sets aside one or two acres of land for the use of the farm hand. If the farmer would only do this, the farm laborer could live with his wife and family in comfort, and he

would be better off than in the city.

Let me point out briefly two or three things that have broken down the loneliness of farm life. There is the rural telephone, and through the development of water powers, it is now possible to extend to the farm, electricity and sanitary conveniences, and pumping outfits for water supplies. All these things have a tendency to make life on the farm better. They can have the conveniences that the city resident now has. 17,000 automobiles have been purchased by the farmers of Manitoba, Alberta, and Saskatchewan; I would not care if it was 70,000. Let us give to the worker on the farm a man's wage so that he can enjoy all the benefits of civilization and some of the so-called pleasures which are dangled before his eyes and that have been forbidden him in the past; let him come in with the workers in the city, and the more he sees of city life and of the struggle for existence in our cities the more anxious he will be to return to the farm, and the glorious opportunities that are entirely out of reach of the city worker.

The International Labor Body which is composed of representatives of the Government and representatives of the workers and representatives of the employers throughout the world is not losing sight of the importance of this great question. It is the intention of the governing body to place

on the agenda of the 1921 conference, the whole question of the development of the agricultural industry, and foremost comes technical education for the farmers. The question of the shortening of the work day will also be brought up; I do not want anyone to be shocked at that because it has been possible in other countries to do it, and it will be possible in Canada. The arguments that have been put forward as to the impossibility of shortening the work day on the farm have proven to be fallacious. It has been possible to introduce the 50 hour week and the 48 hour week in winter. It has been possible in Italy, England, and some other European countries, by agreement with the farmer and his laborer to introduce that system, and a bill is now pending before the Italian Government for the legalization of the 8 hour day for agricultural workers. Problems which have been capable of solution in other countries are capable of solution in Canada. Farmers can co-operate for the purpose of selling their products so as to obtain the very highest price, and the consumer can co-operate so that he can purchase at a reasonable price the products of the farm. The elimination of the middle men who are the bugbear of the producer both on the farm and in the city, is a problem that we are facing. We all desire that a higher standard of living shall be established for the worker in Canada.

FEDERAL AND PROVINCIAL AGRICULTURAL POLICIES.

President L. S. KLINCK, University of British Columbia.

Mr. Chairman and Gentlemen:—

In common with other speakers at this Convention, but little option has been allowed me by the Organizing Committee in the selection of my subject. To the original

title, "Federal and Provincial Agricultural Policies" they have permitted me to include the policies of the Colleges of Agriculture. This extension of scope makes possible a more balanced treat-

ment of the three closely related agencies which should be considered as the component parts of a national policy for agriculture in Canada.

As one who has for some years been in close personal and official touch with those who are administering the Federal and Provincial Departments of Agriculture, I feel that it would not be just or fair to criticise adversely these branches of the Government service without at the same time pointing out some of the defects in the College of Agriculture—defects for which, as a member of the staff in an Agricultural College, I assume my full share of responsibility.

This task, as I have already intimated, is not a self-imposed one. A fair and impartial treatment of the subject calls for more skill than I am capable of, and for more courage than I could at first



muster. And yet criticism, even though adverse, need not necessarily be a cold business. If my treatment is destructive your opportunity will come in the discussion; if it is constructive, or even suggestive, let us face the issues squarely.

Because it is basic, the relationship between these three divisions of agricultural work is one of the most important questions to be considered by this Society. In my treatment of the subject I shall aim

simply to sketch the main outlines, without any suggestion of finality, and shall purposely avoid being unnecessarily specific in matters of minor detail since you all know to what extent the principles enunciated will be applicable in your respective fields of endeavor.

With the salient features in the origin, history and growth of these three branches of agricultural service we are all familiar. In the initial stages in the development of each, they occupied separate and distinct fields. Gradually, however, as each extended the scope of its activities, the old lines of demarcation became less and less distinct until at present in such sub-divisions of the field as "extension," for example, a dividing line no longer exists; and one does not require unusual powers of discernment to see that there is a possibility of a like situation arising in other lines of agricultural work.

The reasons for this are obvious. Organizations, governmental or otherwise, naturally, and in large measure rightly, bend their energies in the direction from which come the public demand and the public response. If the demand is persistent enough the temptation becomes very strong for the Agricultural College man to neglect teaching and research and devote all his energies to extension. Hence we see in some provinces similar work being conducted by two or even three separate agencies, while basic work which should be done by at least one of these is almost or wholly neglected. A careful study of the relations of the Dominion Department of Agriculture with Provincial Agencies—governmental and educational—reveals many splendid examples of co-operation, but also, unfortunately, equally striking instances of lack of co-operation and co-ordination which in some cases are a near approach to chaos.

In Canada there is no industry which the government can foster and develop with greater propriety than that of agriculture. With few exceptions our governments have recognized this fact and have voted large appropriations without always enquiring as fully as they might as to the efficiency of the organizations designed to give effect to their intentions. One of the results of this policy is that today there is a danger of re-action: in fact in some quarters it has already set in. The number of organizations functioning in agriculture and in agricultural education is considered by many to be too large and as a result the people are coming to demand an explanation.

To point out defects in a system is, however, comparatively easy; to diagnose the case is much more difficult. Skill, constructive ability and a high order of public spirit on the part of all co-operating are necessary to evolve and to put into force an effective remedy.

Reorganization of Agriculture in Canada has not been effected, or even seriously attempted, primarily because it is admittedly so difficult. And perhaps this is an opportune time to remind ourselves that responsibility will temper the most radical, even when given a direct mandate to effect a needed reform.

That the necessary machinery has not yet been perfected for the efficient and economical carrying out of the agricultural affairs of this country is evident. To illustrate this point I cannot do better than refer to the conditions which obtained in the Province of British Columbia in the spring of 1914. Happily that condition no longer prevails and today in few, if in any of the other provinces is there a better understanding or closer co-operation among the Departments than is to be found in the

most westerly province of the Dominion.

Briefly stated, the situation in respect to agricultural organization in British Columbia in 1914 was as follows: "Colony Farm," which is a provincial government institution with a well-deserved international reputation because of the excellence of many of its classes of pure bred stock, came under the Provincial Secretary. The illustration dry land farms, on which certain experiments were conducted with field crops, and in systems of dry land farming, were presided over by the Minister of Lands. Experiments on the illustration and demonstration farms outside the dry belt were planned and executed by representatives of the Department of Agriculture; and when the College of Agriculture was being organized there seemed to be but one place to put it, namely, under the Minister of Education, who was also Provincial Secretary. Is it any wonder, therefore, that with three established lines of agricultural work under as many Ministers, and a fourth one projected, that the people of the Province should begin asking very pertinent questions? As a result of the agitation which followed, a series of conferences was held which resulted in the drawing up of an agreement which, while it did not dispose of all the anomalies, nevertheless proved of great value in eliminating many of the more objectionable features in the old arrangement, and in constituting an admirable working basis for future lines of co-operative action.

So satisfactory has this understanding been that Professor Boying was encouraged to advocate a more comprehensive plan, designed to include all agronomic workers in the province. I am tempted to enlarge upon this very promising and significant move-

ment, but being not unmindful of the fact that Professor Boying is the originator of the idea, and that he outlined the plan for his colleagues several years ago, I shall invite him, when opportunity for discussion is given, to state the

While the illustration given to show the lack of co-operation and co-ordination which existed in British Columbia six years ago is perhaps the most striking one with which I am familiar, many of you will, I am sure, from your own observations and experience, be able to cite other examples which call for equally united and thorough-going action.

Unfortunately then, lack of co-operation still exists between (1) the Dominion and Provincial Departments of Agriculture, (2) the Provincial Departments having the same or similar problems, (3) the Dominion and Provincial Departments and the Agricultural Colleges, and, what is still more pronounced and regrettable, (4) between agricultural teachers and investigators in the different colleges.

When in addition to these three main divisions we consider other organizations which are performing special service in the interests of Canadian agriculture, such, for example, as (1) the Commission of Conservation, (2) the Canadian Seed Growers' Association, (3) the Honorary Advisory Council for Scientific and Industrial Research, and others which I might name, is it surprising that the general public is coming to ask what it all means, and that many public men are becoming extremely skeptical as to the wisdom of extending a service which, to say the least, appears to be so poorly co-ordinated?

Nor is this all. Lack of co-operation, and co-ordination, not infrequently exists between departments and branches in the same division of the service, and

between departments in the same institution of learning. Regrettable as this is, the fact remains, and in moments of depression we sometimes fear that perhaps it will continue to persist until human nature changes for the better.

The underlying reasons for this state of affairs are not far to seek. A college education, or the possession of more than ordinary intelligence, does not, unfortunately, insure easy and harmonious co-operation. Professional jealousies, particularly among specialists, are not unknown; inter-departmental and inter-institutional rivalries not infrequently constitute a heavy handicap to the cause of progress. But perhaps the most potent reason is that the scope of the activities of the different agencies, and of the workers engaged therein is not clearly and definitely defined.

These conditions all militate against prompt and effective co-operation, as does also the almost prodigious distances which divide us—conditions which I fear will become accentuated when the West shall call for a relatively smaller number of men from Central Canada, and so will have fewer interpreters of the spirit and methods which actuate those at the seat of government.

These are a few of the very real difficulties which will confront any administrator who is courageous enough to undertake a thorough-going reorganization of a department, be it governmental or academic.

That there is need for a Dominion Department of Agriculture, for Provincial Departments of Agriculture, and for Agricultural Colleges, is unquestioned. Presumably each organization has its distinctive functions to perform. There are, however, certain lines of work which are regarded by some as properly coming under two or more of the main organizations just referred to. About

these the controversy centres; and it is to these that attention must be directed until the necessary adjustments have been made.

Before attempting to state my views as to the functions of each of the three great divisions of agricultural work in Canada, permit me to say that in my opinion some minor activities cannot be definitely classified and that their satisfactory adjustment can be brought about only as the result of conference and of public spirit on the part of the negotiating organizations. Even then there will be still some unavoidable duplication which, however, within limits, is not without justification from the standpoint of the investigator as well as from that of the teacher. But let duplication be reduced to a minimum and where unavoidable let us see that our energies are directed to co-ordination in plan, and the publication of results.

The following classification of functions is suggested as a tentative working basis for what I hope will prove an exhaustive study of a pressing need in Canadian Agriculture:

Functions of the Dominion Department of Agriculture.

1. National problems of administration.
2. Control measures affecting distribution and marketing.
3. All researches of national or international importance, including those undertaken to solve problems affecting interprovincial and export trade.
4. Some measure of financial assistance to the provinces to be given under strict regulations and to be conditional upon equally generous grants from the Provincial treasuries.

Functions of the Provincial Departments of Agriculture.

1. Provincial questions of administration and control.
2. All illustration and demon-

stration work.

3. Assume responsibility for extension work where adequately staffed; where not so staffed extension work might properly be undertaken temporarily by the College of Agriculture.

4. Except where the Colleges of Agriculture come under the jurisdiction of the Minister of Education, the Department of Agriculture, through the staff of the Agricultural College, should determine the educational policy of the Province as it relates to agriculture.

Functions of the College of Agriculture.

1. Teaching: The training of teachers, researchers, farmers, members of administrative and technical staffs of Government, journalists, etc.

2. Research: (a) In pure science. (b) In applied science in relation to problems not primarily inter-provincial or national.

3. Extension: The amount and character of the investigational or teaching work undertaken to be determined by agreement with the Provincial Department of Agriculture or the Department of Education.

Although, as we have noted, many splendid examples of co-operative effort are to be found in our present systems of agricultural administration and education, the fact remains that closer co-operation and better co-ordination of the agencies working for the development of agriculture in Canada is not only desirable but absolutely necessary. Some way must be found to bring our different, but naturally related organizations into closer and more effective contact. "Unity of purpose, plan and action must be secured." Unnecessary duplication must be eliminated. Agricultural research methods must be standardized so that the results obtained by one investigator may be compared with those obtained by another.

Opportunities must be afforded workers in the same or related fields for contact, which cannot but prove stimulating and enlightening.

To this end a memorandum setting forth in detail the policy and work of each organization in each province should be prepared and made available for all interested.

The prospect for these needed reforms originating within the organizations directly concerned is, I fear, not such as to give large warrant for success. The suggestion that a small body of individuals, with an intimate personal knowledge of the requirements of Canadian agriculture, but preferably not officially connected with any of the three branches mentioned, make an exhaustive study of the whole question of the division of fields of work and of Government assistance thereto in all its phases is one upon which I cannot now improve. The adoption of this suggestion would, in my opinion, lay the foundation for a comprehensive agricultural policy which would meet most effectively present day requirements.

Discussion.

DR. GRISDALE: I have listened to this address with a great deal of interest and for the most part I am agreed. I would like to ask Professor Klinck if research work is an interprovincial character or Dominion-wide character, and should it be undertaken by the Dominion, or if extension work is to be entirely cut off from the Dominion; would he propose that information should be given to the public by the Dominion Department?

PRESIDENT KLINCK: While science recognizes neither inter-provincial or national boundaries, there are problems which are of greater scientific and practical interest to one country than they

are to any other. Similarly there are problems which press more insistently for solution in one province than they do in another. As I have stated, researches of a national or inter-provincial nature should be conducted by the Dominion; those which are more nearly local in character should be carried out by the research staff in the scientific departments of our Colleges of Agriculture, or by the Dominion Government in close co-operation with the colleges when the researches bear directly on inter-provincial questions. Arbitrary bounds cannot be set without doing violence to the spirit of research; but I think the principle enunciated, if broadly interpreted, is absolutely sound.

The Colleges of Agriculture should, in my opinion, train their students more broadly and intensively than they are doing. Post-graduate courses, designed primarily to train men for teaching and research, are urgently needed. At the same time experimental and investigational work should be stressed in order that a solution may be found to the problems confronting the farmer. The question as to whether the Colleges of Agriculture and the Dominion Department of Agriculture should each build up an organization to carry the results of their investigations direct to the people is, perhaps, a debatable one. Personally, I am inclining more and more to the view that the Provincial Government should, through its District Representatives, assume responsibility for the taking of this information to the people.

DR. GRISDALE: This question of co-operation between the Province and the Dominion and the limitation of the work carried on by the Provinces has received a good deal of attention from these departments for sometime, and last March we had a gathering here

of the Deputy Ministers and the Chiefs of the different Departments of Agriculture. Of course it was quite impracticable to solve all the problems at that meeting, but a great deal of good work was done, and it was agreed that the Dominion should continue to run the stations as they do now until the Provinces were ready to take them over, and if the Provinces want them tomorrow they can have them.

PROF. BARSS: Yesterday, Mr. Putnam, in talking on the subject of extension work in the colleges raised a big question which might have been discussed for some time: What should be the exact relation between extension work and the college or university? That point was left unstressed by President Klinck. I feel in my own mind that the work of the Provinces may be even more limited than has been suggested, and the work might be under the direction of the College or University. I do not know whether that would be possible or not, but it seems to me that if it were put under the college, there would be less possible chance for duplication.

PRESIDENT KLINCK: I think the responsibility should rest with the Provincial Department. The majority of the staff in our Colleges of Agriculture are already over-worked. These men respond to pressure the same as other men do, and since extension work demands men of wide knowledge and long experience the temptation is for the most broadly trained ones to respond to the pressure even at the expense of the more advanced work in which they are primarily interested. Our teachers and investigators must keep in touch with the problems of the farmer, but this result can be attained with the minimum expenditure of time and energy by assisting the District Representatives when-

ever it is possible for them to do so without sacrificing the basic work upon which all permanently successful extension must ultimately rest.

The need for post-graduate courses and the urgent demand for the strengthening of our research departments has been emphasized again and again in this conference. The need cannot be too strongly presented or the demand too insistently pressed. There is only one source from which our teachers and investigators can come. If we see to it that adequate opportunities and facilities are provided for the most advanced work, then we need have no fear as to the supply of competent district representatives.

MEMBER: I think it is advisable that the extension work should be directed from the college or university; they must have a chief and it seems to me it would be better if that chief were on the staff of the university, and the extension men on the staff of the university. If you have a member of the Department of Agriculture dealing with the public and you have a university dealing with the public, the public will be lost trying to worship two gods at the same time. If you have extension men not connected with the university, where is the inspiration from a technical point of view to go? You will have a large number of men not getting the best they can out of their work. It seems to me that the technical department by being in close touch with the Chief of the extension work could keep better tab on the teachings of the District Representatives. By having a chief at the university for the extension work, you would have a point of contact between the different technical departments, the Department of Agronomy and Animal Husbandry and so forth,

and you would be able to balance the extension work much more satisfactorily. Take the School Fair Work; it has been popular, and the District Representative is liable to be overwhelmed by it and neglect other work. With all due respect to School Fair Work, there are other lines of endeavour that he might give a great deal of attention to.

MR. PUTNAM: It might make a difference whether the extension work was directly under the Department of Agriculture or under the agricultural college. The essential thing to my mind is that whoever is in charge of the extension work should see that the men who are doing the field work are kept in close touch with the investigatory work. Take for example the dairy work in the

Province of Ontario. We have a large staff in the field, and we are up against every-day problems in the factory and creamery, and we have investigatory work and experimental work at the colleges. It is necessary for a man who goes out to do work among the factories to know the field problems and to know what is being done by those responsible for investigatory work. It is essential that they should be in direct contact with the colleges. President Klinek made it clear that the general policy of the college must be determined by the Department of Agriculture and the details worked out by the college staff. You must have all the interests in the different lines represented in your deliberations and in outlining your programme.

SCIENTIFIC RESEARCH IN RELATION TO AGRICULTURAL PROBLEMS.

Dr. W. P. THOMPSON, University of Saskatchewan.

I am proud of having an opportunity to assist at the birth of this new society. In this case it seems that parturition has been long overdue—perhaps owing to the size of the embryo, if one may judge by the secretary's statement of membership. At any rate it proves to be a very vigorous healthy youngster and since it will be watched over by all these experts in nutrition, diseases, etc., one can safely predict for it a rapid growth and active maturity.

I must ask you not to estimate my modesty by the title of my remarks, which appears on the program — "Scientific research in relation to agricultural problems." This very large subject has been assigned to me by your committee and one consents to discuss it on the present occasion only because the relationship of scientific research to the industries in general has recently been thoroughly dis-

cussed and forcibly brought home to everyone. The relationship of scientific research to agriculture is only a particular phase of this



general question which has been frequently and ably discussed from many quarters. It would serve no useful purpose to point out particular agricultural examples of principles which should be familiar to all scientists. It will,

therefore, not be necessary to attempt a comprehensive treatment of the subject. It will be sufficient to point out certain respects in which the relationship is peculiarly important to agriculture, or in which agriculture differs from the other industries. In accordance with the desire of your committee, I shall speak largely from the standpoint of the so-called pure scientist.

Agricultural scientific research suffers more than does any other form of industrial research from a lack of realization on the part of the general public of its possibilities. This is due, I believe, to the familiarity on the part of the majority of people with agricultural operations. Anyone will concede the value of research in relation to manufacturing industries involving chemical actions. The great majority of people are innocent of any knowledge of chemistry, and regard it as a highly complex, mysterious study capable of performing all sorts of wonders—in which opinion they are not discouraged by the chemists. But everyone thinks he knows something of agriculture and many people think they are experts at it. To most people agriculture is simply taking a little care of plants and animals which would grow anyway. They can see no need of investigation in such familiar operations as ploughing, harrowing, harvesting and threshing. And it is through average public opinion that the expensive support for research must be obtained. The head of an agricultural college informs us that it has just taken him three years to convince his board that a plant pathologist has any useful duties to perform.

Of course all technical agriculturists know that agriculture, like the other industries, has reached a stage at which little progress can be expected from casual ob-

servation or ordinary experience. Progress will result only from the careful application of scientific facts and principles which are known only to those who have been properly trained, or which have not yet been discovered. Agricultural problems are just as difficult and complex as those of any other industry. Our confidence that great progress will be made by the application of scientific principles in agriculture results from our knowledge of what has been accomplished in this way in the past. The achievements of agricultural scientific research in actual financial benefits to the country are not surpassed by those of any other industry. This is not the occasion, however, either to mention the problems which have been solved or to point out those which can be solved by the application of scientific principles. Owing to the fact that such a large proportion of our population must always be engaged in agriculture, any advance through scientific work must result in benefits which in the aggregate surpass those in other industries.

My second point is that technical research in agriculture involves research in an unusually wide range of basic subjects and that the technical researcher in agriculture is therefore peculiarly dependent on so-called pure science. Agricultural problems involve, among other things, the physics, chemistry, biology and geology of the soil, physiology of plants and animals (itself including many basic subjects), pathology of plants and animals, systematic biology, including entomology, foreign plant introduction, genetics, bacteriology, mechanics, climatology, sociology and economics. Many problems involve several of these subjects. There are, of course, routine problems such as testing varieties, rotations, etc., which may involve little more

than general agricultural knowledge. But the problems which will result in new departures of importance are likely to demand a profound knowledge of basic subjects. The big advances requiring only superficial science have mostly been made, and progress in future will depend more and more on profound study in more than one basic subject. The workers in these basic subjects supply the raw material—scientific information—which the technical agriculturists work up into manufactured articles—better agricultural practices. To sustain our metaphor further these manufactured articles are transported by the agricultural educationists to the consuming farmers.

Of course, as in other cases, the workers in these different fields ("fields" is surely a good word in an agricultural discussion) cannot be sharply segregated. Many technical men engaged primarily in improving practices are also spreading information among the farmers; many of them are making discoveries in theoretical science. The same piece of work may involve both discovery and application. To use a simile from our own subject, the technical agriculturist may be considered a cross between the so-called pure scientist and the farmer. And as in Mendelian crosses, there are degrees of dominance with respect to the contrasted characters of the parents. Sometimes the technical man is mostly pure farmer, sometimes mostly pure scientist, sometimes exactly intermediate. Not rarely the cross proves too wide and the offspring are completely sterile.

Owing to the unusually wide range of basic subjects this relationship of pure and applied science is peculiarly important in the case of agriculture. It is hope-

less to expect a technical agriculturist to keep thoroughly posted in all the subjects ancillary to agriculture; it is equally hopeless to expect a worker in an ancillary science to keep posted on practical agriculture. There is need of special machinery to stimulate discoveries in those parts of the basic subjects related to agriculture and to provide for their immediate application.

The solution of this difficulty and others presently to be mentioned depends, in my opinion, on a large degree of organized co-operation in research. All the reasons in favor of co-operation in industrial research in general apply in the case of agriculture and these are strong additional reasons.

The peculiar dependence of technical research in agriculture on research in a wider range of basic sciences demands co-operation between the pure scientist and the technical man. A technical agriculturist endeavoring to solve a practical problem is very likely to encounter a fundamental problem. A fundamental researcher is very likely to uncover a fact or principle which can be immediately applied—if he knows enough of the practical to make the application. Sometimes a technical man's duties and interests and training will permit him to follow up a fundamental lead. Sometimes a worker in a fundamental subject, may know enough of the practical and possess the inclination to make the application. But such cases are likely to be relatively rare. It seems obvious that the best results both from the practical and theoretical standpoints are to be obtained by close co-operation of all concerned. The practical man knows the problems and discovers where fundamental information is lacking in order to solve them. He can then enlist the service of the pure scientist in those problems

which his duties, or training or interests will not permit him to attack. At the same time—and this is not the least important effect—theoretical science will be advanced. There will be a complex series of effects and counter-effects of the theoretical on the practical. It cannot be too strongly emphasized that theoretical science receives as much from practical science as it gives to it. The theoretical advances made in practical research are as important as the practical advances made by the application of theoretical principles. And in agricultural problems the possibilities are particularly great.

I should like to refer to a particular example of what I have in mind. A very practical problem is the breeding of disease resistant plants. In the case of stem rust of wheat it turns out that the problem involves fundamental genetic work. But the prosecution of it requires a very substantial knowledge of plant pathology and its methods; it can be carried on best in collaboration with a plant pathologist. Moreover it has recently given a very valuable lead in fundamental botany by showing the existence of many physiological and geographical races of rust which can be distinguished only by their virulence in particular varieties of wheat. Stakman and his collaborators have proven the existence of many of these geographical races in the northern States and work at Saskatoon this year has demonstrated the existence of several scattered over western Canada, as well as the occasional occurrence of more than one race in the same locality. This discovery seems for the time to have made a practical solution impossible. But the point is that the geneticist and plant pathologist have had to collaborate on the problem and both have un-

covered important leads for theoretical research. And before economic results are obtained the practical agronomist must be enlisted to test yields, earliness, etc. This investigation also shows the necessity of having the same work carried on concurrently at different places to meet varying local conditions.

Many of the most important problems in agriculture will in this way require the united efforts of several kinds of researchers. This must be true from the very nature of agricultural problems involving as they do a highly complex set of conditions and a very wide range of basic subjects. Without co-operation we find the technical man necessarily spreading his efforts over so many subjects that he accomplished little. This result is already too common. Without co-operation we find the pure scientist making foolish practical claims or helpless before an unusual practical situation. Nor will the best results be obtained when the co-operation consists of the fundamental scientists acting as chore boys for the technical men—performing their chemical analysis, physiological experiments or bacteriological identifications.

Apart from the need of workers of several kinds, many problems are so big that even where only one kind of researcher is necessary, several of these must collaborate if results are to be obtained in reasonable time. Again, in Canada local and environmental conditions are so highly varied that in the case of problems of nation-wide importance work must be carried on concurrently at many places.

With the argument that co-operation is necessary in order to avoid duplication of effect I have no great sympathy. We need both collaboration and duplication or collaboration **by** duplication. We all know of too many cases where

claims have been made which have not been justified by the scientific work, which have injured scientific agriculture, and which would never have been made by several men working together. The cry of needless duplication of effort has been overdone; until agriculturists become infallible we can stand a great deal more duplication. It should, however, be deliberate duplication knowingly undertaken, not that of several men working in ignorance of each others efforts.

That organized co-operation in research can accomplish a great deal when support is available, has been abundantly proven by the war experience of all nations.

In this society we have the machinery at hand to bring about the needed co-operation. This society will soon bring together all Canadian technical agriculturists and, I hope, all researchers in fundamental subjects whose work is in any way related to agriculture. Projects to be attacked can here be divided into phases and each man assigned the phase in which he is best qualified or most interested. Varying local conditions can be met by providing for the concurrent prosecution of similar work in different places. The groups must be democratically organized and co-operate freely; they cannot function if one man assigns tasks to others. There is no need of entering into details at this time. They can be worked out to suit the problem.

Such a program will require frequent group meetings for consultation, formulating and modifying plans, reporting results, etc. These meetings can best be held in connection with the conventions of this society. On account of the great distances involved, it will be necessary that the institutions to which these men are attached should pay their travelling expenses. I believe that little diffi-

culty will be encountered in this respect. Certainly these institutions could spend their money in no way which would be likely to yield more valuable results, not only in actual problems solved but also in keeping their staffs efficient.

That a program of consultation and collaboration will receive wide support is shown by the resolutions passed at the conference of deputy ministers of agriculture recently held at Ottawa. A resolution concerning Experimental Farms passed at that conference reads, in part, as follows:

"Be it resolved that... definite measures be adopted that will bring about greater co-operation in planning, conducting and giving publicity to the results of Experimental Farm work, to wit:—

"(a) The formation of joint Provincial Advisory Committees to be composed of representatives from the Dominion and Provincial departments of agriculture...

"(b) That such provincial committees shall meet not less than once annually to consider the results of experimental work... for the preceding year or years and to discuss and as far as may be possible recommend and approve contemplated lines of experimentation for ensuing years with a view to building up a system under which the work of the respective stations shall, as far as possible, be supplementary to and co-related with each other...

"(c) That from time to time... conferences of these committees or representatives thereof from groups of provinces or all the provinces be held..."

Another resolution with respect to plant breeding reads, in part, as follows:—

"Be it resolved that plant breeding work in Canada whether carried on under Federal or Provincial direction should be fully co-ordinated and correlated by the

holding of Conferences of Canadian plant breeders... that the mode of extension (of plant breeding work) be arranged by conference from time to time between Federal officers and the officers of the provinces concerned so as to avoid duplication of effort and attain the maximum degree of efficiency."

It is of course possible that local jealousies and personal affairs may interfere with the working out of such plans. I have heard of an institution where one kind of worker may study an insect so long as it remains in the air but as soon as it penetrates the hide of a cow he must not seek to follow it; it then becomes the property of a different sub-department. If it digs into the ground another sub-department claims it. I know that some technical agriculturists are constantly on the watch lest a botanist or chemist tread on their preserves, and that some pure scientists have "no trespassing" signs up for technical agriculturists. When members of the same department quarrel over such things we may expect trouble in a larger organization. The division of credit for work done may cause some heartburnings. But I believe the good sense of all concerned and the desire to get results will overcome all such difficulties. And a little experience in co-operative work will soon convince everyone of the essential decency of scientific colleagues.

Such work need not interfere with anyone's initiative, and no matter how much co-operation may be secured in solving practical problems, undoubtedly much of our progress will continue to depend on individual brains and initiative and imagination. Co-operation cannot replace intellect but it can make intellect much more effective in solving certain kinds of problems.

Moreover it must be remembered that co-operation can be effective only with certain kinds of problems. The problems must be clean-cut, easily outlined. The end sought must already be perfectly clear; the probability of success must be demonstrable; the methods of attack must be fairly obvious from the data at hand. But there is another kind of studies—those which really open up new fields of interest and importance. These studies must be highly individual and do not lend themselves to co-operation. Such problems cannot be outlined because they are not known or are perceived only vaguely. One gets a hint but the end of the trail is not clear; the success of the work is doubtful or may appear ridiculous. The project cannot be outlined so clearly and attractively as to enlist the help of colleagues or the support of executive boards which control funds.

And just here, it may be remarked, is a defect inherent in all institutions and organizations whose specific purpose is the carrying on or support of research. The directors or chiefs cannot give financial support unless the problem can be clearly outlined, and the probability of its solution demonstrated. They must thereby exclude many of that second and higher type of researches to which I have referred. If Mendel had had to ask the prelate of his monastery for land and labor to carry on his experiments, he could not have justified his request by predicting the discovery of his law of heredity. There is after all some advantage in holding a teaching position in which one can potter at whatever notions one conceives without having to justify them to someone controlling his salary and without having to give reports at intervals. We teachers are not as envious of you full-time research men in govern-

mental positions as you might suppose.

For the same reason it would, in my opinion, be a mistake to do anything that would tend to concentrate research in governmental departments or institutions. Every teacher should be encouraged to work at whatever problems he wishes to attack. When a man's teaching or other duties are sufficient to justify maintaining him and yet leave him time for research he is more likely to choose problems which break new ground than if every research has to be justified even for the reason that he is paid a salary for research.

They must in general be no restriction on a man's choice of problems or on the distance to which he may follow a research lead. For this reason I must object to the suggestion made today that provincial men confine themselves to problems of provincial importance and that problems of wider significance be reserved for the Dominion Department of Agriculture. One never knows where a train is going to lead—that is one of the chief attractions in investigation work. If a worker in Saskatchewan uncovers a trail which leads over into Manitoba or Ontario or the States, he won't stop at the boundary. The wider its significance the harder he will follow it. Our most important provincial problems are of equal importance outside provincial boundaries. You cannot say to a provincial man "You may study these little local questions, but you must leave the big things to the Dominion men at Ottawa." Only a very mediocre set of men would endure such a restriction.

Apart from helping by co-operation in the solution of practical agricultural problems, the worker in a basic subject can do a great deal by judicious choice of problems and materials. A geneticist or plant physiologist for example

in attacking a fundamental problem can use a crop plant of great economic value just as well as the usual greenhouse plants.

At the same time he is likely to reveal, perhaps incidentally, perhaps directly, information of great practical importance concerning the plant. Our scientific men could attack these problems on the borderline between the theoretical and the practical. They could attack a practical problem not only for its own sake but in the full expectation of uncovering a theoretical lead. In many cases in the past they have not attacked practical or semi-practical problems partly because of ignorance concerning them, partly for fear of offending technical colleagues.

Another difference between research in agriculture and that in the other industries concerns the remuneration of the workers. The industrial research man shares, in part at least, in the financial benefits which accrue from his work. Great increase in wealth results from the perfection of a technical invention. Even if the researcher is a hired employee of a corporation he shares handsomely in the benefit. The industrial researcher therefore always feels the powerful financial stimulus.

The agricultural researcher, on the other hand, deliberately renounces all such rewards. In that respect he is like the pure scientist. Though his work may result in great financial benefit to his country, he knows that he will profit not at all or very slightly. From the nature of his work he must be attached to governmental or educational institutions, and he knows that the salaries in such positions can never be very large. But when for the sake of his work he renounces hope of becoming wealthy, he can surely expect a reasonable salary. If good researchers are to be retained in and attracted to

involve an almost complete separation of the courses for technical agriculturists from those for the men who are to return to the farms. In short our ideal should be to bring our professional agricultural training abreast of our training for other professions by requiring as pre-agricultural study a large amount of, and as soon as possible complete, arts work. Only in this way can we secure a sup-agricultural work, the remuneration must be sufficient, not to compete with what other industries offer to research men, but to make possible comfortable habits of life. Our standard joke concerning the salaries of teachers is unfortunately just as applicable to positions in which the teachers are also researchers and to those in which research only is carried on.

There is another aspect of the relationship between scientific research and Canadian agricultural problems to which I must refer, namely, the educational aspect. It should be perfectly clear that the men who are to do worth-while investigational work in agricultural problems must have a thorough training in the basic subjects as well as a broad education in the languages and humanities. As I have already pointed out, a thorough understanding of agricultural questions demands a peculiarly broad acquaintance with many fundamental subjects. The problems of agriculture involve just as complex scientific conditions as do those of medicine or engineering for example. And the men who are to solve them must have just as broad and thorough a fundamental training as the researcher in medicine or engineering. Moreover, apart from his research, the technical agriculturist has to face just as many situations requiring broad education and culture as have any other professional men.

Now the medical colleges re-

quire the equivalent of two years of arts work with specified large credits in the sciences, before admission is granted to the purely medical studies. Some indeed require full arts graduation and all medical authorities advise graduation in arts even where they do not require it. All this is required of those who are to become only general medical practitioners. Much more is necessary for the research man.

Similar conditions are found in regard to the training for other professions. In engineering, law, divinity, a broad fundamental training is considered necessary and is generally required. At the recent Canadian Universities conference held at Quebec a resolution was unanimously adopted calling for large increases in English, history, economics and particularly fundamental science in the training of engineers. The ideal of all educationists in these professions is to secure complete arts graduation before admission to professional studies, and failing that a large and specified amount of arts work.

In my opinion the professional agriculturist should have just as thorough a pre-professional training. This is true not only for the researcher in agricultural problems but also for agricultural teachers in schools or colleges, district representatives, inspectors, laboratory men and various administrators.

In those institutions which include both arts and agricultural colleges, it should be easy to arrange for such training. The pre-agricultural students should be taught in the same classes as the pre-medical students, or pre-engineering students, or straight arts students. In other places the students may not be given the formal arts classes but he should get the equivalent of them in a thorough broad training during

the first two years. In all cases, if he is to benefit by his work, complete matriculation should be demanded before the student is permitted to enter. It is essential pedagogically that the basic subjects be taught before the student takes up the professional ones. They should certainly not be tackled on after the student has taken his professional work. This will ply of properly trained research men as well as of other technical agriculturists.

The educational aspect of the relationship also involves the question of graduate work which is a very pressing one in Canada. But as that is to be dealt with by another speaker, I shall refrain from discussing it.

I said at the outset that I would not attempt a comprehensive treatment of the subject—in spite of the time I have taken. I have tried to emphasize four respects in which, in my opinion, the relation of scientific research to agriculture is peculiarly important in Canada at the present time. They may be designated: (1) Foundation; (2) Co-operation; (3) Remuneration, and (4) Education.

Discussion.

DR. SAUNDERS: I would like to thank Dr. Thompson for his admirable paper, and to say that I endorse most heartily what he said as to the necessity of men engaged in research work being free to go where they would and do what they liked. The man who does scientific research work is a very curious individual from the point of view of the individual man. He is a crank, and if he does not have his own way, he will not accomplish much. The weakest point at present in agricultural science is at the top. Dr. Robertson emphasized contact with the farmer. Of course that is absolutely vital,

but there is a long space between contact with the farmer and agricultural research; that space is not so badly filled at the present time, but where we are weak is in the head. We are not rotten in any sense, but we are hollow, and the sooner we realize that the better.

DEAN HOWES. I would like to know just how widespread and general is the condition which makes it necessary to outline almost in detail and tell what the outcome will be when any research work is being taken up. I have been very much pleased with the points brought out by Dr. Thompson that the research man should not be restricted by having to be a professor as well as a research man. When one of our professors undertook some work in live stock investigation, one official took him very severely to task and said he should not be allowed to undertake such work because he did not know what he was going to get out of it.

PRESIDENT KLINCK: I wish to thank Dr. Thompson for calling the attention of the convention to the statement which I made this afternoon when I attempted to state what lines of research work should be undertaken by the Dominion Government and what lines should be undertaken by the Provincial Government. I attempted to condense into a very brief statement many things which might be enlarged upon. What Dr. Thompson has stated in regard to that work is in hearty accord with my own views. We all know that men who undertake research work should be given a very free hand and in the course of their investigation they obtain new light which permits greater results than were originally looked for.

It gives me great pleasure at this time to ask Dr. A. B. Macallum to address you.

THE AIMS OF THE RESEARCH COUNCIL IN RELATION TO AGRICULTURAL PROBLEMS.

Dr. A. B. MACALLUM, Chairman of the Research Council.

Mr. Chairman and Gentlemen:

I am really at sea tonight. When I was invited to address you I was told that there would be some question of general policy come up in a paper which Dr. Thompson would read. Now, there are questions of policy discussed in that paper but they are of a kind which will agitate the world for a good many years and upon which the voice of the Council will not be any more decisive than the voice of any individual outside it. I thought my function would be to deal with the aims of the Research Council in relation to agricultural research. That has not been referred to in the paper which by the way is a very valuable one, and I hope it will be published, and made available for those who are interested in the subject. I might add also that the views which Dr. Thompson has enunciated very largely agree with my own. I do not think you can put a handicap on research and expect to get the best from it. I would say further that it ought to be the aim of agriculture in Canada to cultivate a type of mind which goes to make a successful and brilliant researcher. I would not go so far as Dr. Saunders does in calling such a researcher a crank. Faraday was not a crank, nor was Pasteur nor Tyndall, nor Darwin, —all these men who were beacon lights of science in the past. There is, however, something in them that you do not find in the average individual. There is what I would call a kin of a particular character; a qualification which makes a man engaged in research, in spite of himself, peculiar. My experience of 30 years in the University has convinced me of that fact. When I first entered the staff of the University of Toronto

36 years ago, I had the idea, taken from John Hopkins University, that almost every student could be a researcher, but I was in a few years very sadly disillusioned, and I have come to the conclusion now that less than 3 per cent of the students have that particular qualification which will carry them on through a long life's career of research. Men of this type in the past were responsible for the progress of the human race. All that has been achieved has been due to their efforts. The number today who are bringing forward new ideas that will matter eventually are less than one four thousandths of 1 per cent of the population. If you can find these students, give them every opportunity that is possible and leave them very largely a free hand, you will get results which will exceed all expectations. Who, in the "thirties" and the "forties" of the last century would have thought that Faraday who was first of all an ordinary laboratory attendant and later a laboratory assistant to Sir Humphrey Davis, with a salary of a couple of hundred pounds a year, would, in his investigations, obtain results in electro-magnetism which would revolutionize modern industry.

I must, however, get back to the subject for which I am here. I can only say that the Research Council is very eager to assist agriculture as far as it possibly can, consistent with its functions. The Council is called the Honorary Advisory Council for Scientific and Industrial Research, and in the Order-in-Council appointing it the following specifications were given:

(a) To consult with all responsible bodies and persons carrying on scientific and industrial re-

search work in Canada with a view to bringing about united efforts and mutual co-operation is solving the various problems of industrial research which from time to time present themselves;

(b) To co-ordinate as far as possible the work so carried on so as to avoid overlapping of effort, and to direct the various problems requiring solution into the hands of those whose equipment and ability are best adapted thereto;

(c) To select the most practical and pressing problems indicated by industrial necessities and present them when approved by the Committee to the research bodies for earliest possible solution;

(d) To report from time to time the progress and results of their work to the Minister of Trade and Commerce as Chairman of the Committee of Council.

Later on a rescript was addressed to the Council by a Special Committee of the Privy Council in which its functions were given in more detail. Industrial research is mentioned again and again, and we understand that agriculture is the basic industry. Still, the language in which this rescript is put and the ordinary use of the word "industrial" do not specifically imply that agriculture is to be under the auspices of the Council. One of the paragraphs read as follows:—

(e) To make a scientific study of our common unused resources, the waste and by-products of our farms, forests, fisheries and industries, with a view to their utilization in new or subsidiary processes of manufacture, and thus contributing to the wealth and employment of our people.

That is the only reference in our instructions which would enable us to cover agricultural research. Though the Research Council is especially concerned with scientific research, and has

endeavoured to perform its function in this respect to almost the fullest extent, two fundamental sciences, Zoology and Astronomy have not hitherto been included in its activities, and it has been criticized for this but there are very good reasons why the Council denies itself the exercise of any of its functions therein. In the matter of pure science, the Council can support research in many things which concern agriculture, but it has done so, because the problems undertaken, involved research in pure sciences and because also the results may be of immense benefit to the country. The questions which the Council must consider in determining whether it should support a special research in agriculture are:— How far will the proposed research financially involve the Council, and further, is it a problem that could be undertaken more properly and as efficiently by some other body? The answers to these questions determine the action of the Council. If it supported agricultural research unreservedly I may tell you frankly, it would not have a cent left for anything else out of its Parliamentary vote. It did provide for two investigations in Agriculture, one conducted by Prof. Thompson on the breeding of wheat and the rust problem, and another, the bacteriology of cream and milk in connection with the grading of butter and cream. It provided for these researches at a time when it hoped agricultural research would be generously supported by the Provincial and Dominion Governments and it did not expect that it would be called upon to provide further grants, except occasionally. It was however, subsequently appealed to for grants in aid of research on eight or nine different problems, which would have totalled something over \$60,000 at the start, and as this was practically the amount

the Council had for all lines of research it had to call a halt in this matter, and wait until it had additional resources before venturing further into agricultural research.

I believe there is great waste of money in duplication in experimental work in Canada, but there would not be any waste if the work were carried out on some system of co-operation. Even if there were some duplication, providing the efforts of the workers were co-ordinated, it would have one advantage: it would make more certain the results obtained. I have been informed by one who has carefully gone into the question that there is an enormous amount of duplication in experimental work in Agriculture in Canada, and it is not only in this country that such duplication occurs. It also occurs in the United States and Australia. New South Wales and Victoria are separated by the Murray River from which the terrain rises on either side in a gentle slope for miles. On opposite sides of the river at a certain point both States have large experimental farms on which research and experimental work are carried on of exactly the same kind, and about £350,000 a year are thus spent by each of these two States. If that is a true statement of what obtains there, and the party who told me of it was an expert agriculturist from Australia, it is criminal duplication.

There are a great many agricultural departments in Canada, as many as there are Provinces, and one for the Dominion. It is not possible for these departments to co-operate in such a way as to form some organization which would have supervision of all research work that is done in the country? Some of that research work, I believe is aimlessly done, or done in a futile way. Some of the workers are not qualified for the work

which they have been given to do, and in consequence the money thus spent is wasted.

The Council itself is aiming at producing a body of scientific workers in all lines, in Physics, Chemistry, Geology, Mineralogy, Meteorology, Engineering and Biology. Of the seventeen Studentships awarded by the Council for 1919-20, four are held by students who are engaged on problems in Agriculture. One of these, Miss M. Newton, has been investigating wheat rusts under Prof. Thompson, at Saskatoon. There are three working in the Botanical Department of the University of Toronto, on problems in Plant Pathology. The object of the Council in giving these studentships is to support students who have got that peculiar quality I have referred to, while training themselves for research. The Council is not restricting the number of such studentships or fellowships to four; it will give as many in the future as there are students qualified and deserving to get them. I think that is as far as I can discuss tonight the relation of the Council unless there is some point that I have overlooked.

Let me say that I wish this organization to prosper and become as strong as possible, and under the leadership of those, amongst you who are keen for scientific work, I am sure that the country will benefit from the work of this organization. If it is continued and strengthened it will have a very great influence in directing attention to the right objects for agricultural research in this country.

Discussion.

DR. F. T. SHUTT: The work of agricultural colleges is to train men who will be able to undertake investigation work, and I would like to emphasize the desirability and im-

portance of that phase: at the present juncture in our history, there is a great desirability to have men for investigational work. I have been convinced of that for many years, and it is particularly gratifying to hear that point so well emphasized this evening. I am aware that the graduates of our agricultural colleges are able to take experimental work; I am quite sure everyone here will recognize that there is a distinction between certain classes of experimental work in agriculture and scientific work. A number of men who came out here from England reported on how we trained our men, and they said we did nothing in Canada at all to train

men to conduct investigatory and scientific work.

THE CHAIRMAN: I think it is only fair to say that the point you have just made is one of the dominant notes struck in this convention. There is an unanimity of opinion in that line, and the paper presented by Dr. Harrison yesterday in which he outlined courses of study in agriculture and to which a number have spoken, goes to show that the courses now being planned, and in some cases being given in the universities have that object in view. The course are being so framed as to enable colleges to put on scientific work of such a character as to enable them to develop men who will be qualified to do higher research work.

A CANADIAN POST GRADUATE SCHOOL IN AGRICULTURE.

Paper by Dr. M. CUMMING, Nova Scotia Agricultural College.

Read by Mr. L. A. DeWolfe, Director of Rural Education for Nova Scotia.

So far as preparation for life on the farms of Canada is concerned our present system of Agricultural education, while possibly in need of some modification, is of

cultural Colleges, in scientific Laboratories, at Experimental Stations, etc., the scope of our present system is altogether inadequate.



a sufficiently advanced character. But, for that very considerable body of Canadian Agricultural students who are preparing themselves to occupy positions at Agri-

At the various Universities where Arts and Science and Medicine and other branches of learning are taught, the Professors are practically all graduates of some post-graduate course and hold Masters and Doctors degrees. At our Canadian Agricultural Colleges the majority of the Professors barely completed their four year course when they were called upon to teach students who were applicants for the same degree that they themselves held and although some of these Professors have, through private study, added largely to their knowledge and grasp of their subjects, yet many have little more knowledge and training than they possessed when

they first became Bachelors of Scientific Agriculture.

Under such conditions it is inevitable that the teaching, unless in exceptional cases, has not been as profound or as inspiring as if the teachers had acquired a bigger grasp and knowledge of their subjects which only come from a further course of study following the completion of the ordinary Bachelor Course.

In our Experiment Stations and Scientific Laboratories men are today working at some of the most profound problems of the most profound and fundamental subject in the world-Agriculture, whose educational equipment as measured by years at College is barely half that of men who are engaged in similar lines of experimentation and investigation in other branches of science. The result is that no matter what a man's ability may be, such an undertrained investigator is altogether unlikely to make the best use of his opportunities or to arrive at scientific discoveries which Agriculture is so much in need of today. True, there are exceptional men who without any kind of a College course have made profound investigation and have arrived at some of the worlds greatest discoveries, but these men are exceptional. The rank and file, to which group practically all of us belong, need the very best and most extended education we can acquire.

I fancy that there is not a man in this audience who has anything to do with filling positions in Colleges, Experimental Stations or Scientific Laboratories, but who would consider himself most fortunate if he could secure to fill those positions men who, after the completion of there regular Bachelors course, had devoted some years to study under the best Professors that the world affords and who would thereby be equipped

with a training that would make it possible for them to delve into the most profound branches of their subjects. But such men are practically unobtainable for the reason that there it not provided in Canada and only to a limited extent in the United States opportunities for post-graduate study. Our Colleges and our Experimental Stations are all suffering because of this condition of affairs.

There is another viewpoint from which this question should be considered, and it is from the viewpoint of the ordinary graduate of our present Agricultural Colleges who takes a position at an Agricultural College, an Experimental Station or in any branch of the Civil Service. I have little doubt that practically every one of these men at graduation time hoped to continue his studies in some branch of Agricultural science. No doubt some have done so, at least insofar as a course of reading would permit. The majority have either failed to do so or have only carried on their studies to a limited extent. The reason for this condition of affairs is evident to anyone who is familiar with College life at the big Universities of the world. These Universities either provide post-graduate courses or encourage their more brilliant graduates to take post-graduate courses at Institutions of learning where such courses are offered. It is doubtful, however, if more than one or two per cent of all the graduates of Canadian Agricultural Colleges have ever taken a post-graduate course at any institution and unfortunately, when they have desired to do so, they have found it necessary to go to some country other than Canada where such post-graduate courses were offered.

This is not as it should be. What is needed is the establishment somewhere in Canada, of a post-

graduate school that would first of all afford facilities for taking post-graduate courses and that, second, would afford a stimulus to the average Bachelor graduate to continue his studies after graduation. If such an Institution were provided, the standard of education of the members of the staffs of our Agricultural Colleges would be advanced on a par with the standard prevailing at other Institutions of learning; and graduates would be turned out who would be capable of filling positions with the highest possible credit to themselves and with a marked advance in the standard of education at all the Agricultural Colleges of Canada.

I am of the opinion that every person in this audience has already given some consideration to this subject and in all likelihood agrees with everything that has been said in the foregoing part of this paper. The important question is, how and where should such a post-graduate school be established?

For myself I have thought that the most practical way in which to start this movement would be for the various Provincial Departments of Agriculture and the Federal Department as well to offer a certain number of scholarships annually to graduate students who were anxious to continue their studies at American or European Institutions of learning. But this would only be a temporary solution, but none the less a most practical one. The next step would be the actual establishment of a Canadian post-graduate school where the more profound lines of investigation could be carried on, and where post-graduate students might have opportunity to continue their studies in their own special lines. One such Institution would be sufficient in the meantime for Canada. It should not be Provincial in character. Pos-

sibly it should be supported jointly by the Federal and the Provincial Departments of Agriculture, and in all likelihood it might, as has been the case with similar Institutions elsewhere, come in for private endowments. However, that may be the important thing for use all to realize at this present moment is that we cannot too soon have established at some central point in Canada the best equipped post-graduate Agricultural School that may be found in any part of the world, and let me add that this Society of Technical Agriculturists can, in no way, give a better account of itself than by using every influence in its power to get such a school established at the earliest possible date.

Discussion.

DR. J. H. GRISDALE: This subject is one which might possibly better have been treated by one who has been more in touch with academic institutions of learning than I have been for some time. I have not been carrying on any research work for the last ten years, hence I feel somewhat out of touch. I have felt perhaps more keenly than most of you here the necessity for work of this kind being carried on in Canada. I listened with the very greatest interest to the able paper delivered by Dr. Thompson. The reasons for closer study and deeper research and more thorough training to men identified with agricultural research could not have been more lucidly given and more completely outlined than was done by Dr. Thompson, and I hope, Mr. Chairman, that every member of this Society will take a day off and study that paper and attempt to digest it. It appears to me to contain matter for a great deal of thought and most careful consideration, matter that may well be brought up for dis-

cussion here. I think no fuller analysis of the situation could have been given.

I regret I was unable to be present yesterday when Dr. Harrison took up College Courses, but I have had two or three chats with Dr. Harrison on this matter and have some idea of the lines he followed. The reasons for the inception of such courses are multitudinous, and I do not propose to attempt to discuss them here to-night. We know from experience that the average graduate leaving the halls of learning at the different points in Canada where agricultural science is taught is of very small value as an investigator or even as an instructor unless and until he has had two or three years' experience. Many of the graduates of these institutions feel that they know it all—not quite, but nearly all—when they leave those halls. We who have had to do with these young men when they enter the service of the Federal or Provincial Departments find out very soon that they have a great deal to learn, and it takes them from two to four or five years to become at all satisfactory as investigators or technical men. If we had at our technical institutions an opportunity to carry on this work in which they have taken elementary courses—because that is about the best one can say about the courses—if we had some opportunity for them to enlarge on these courses, they would leave there after two or three more years' work fitted to carry on work that would be of real value to the country. I am of the opinion that it would have the effect of materially increasing the remuneration at which these men would be engaged. As Dr. Thompson said, the man who is satisfied to carry on investigatory work of a purely scientific character is a man who is satisfied to remain comparative-

ly poor most of its life. If we can assure our graduates, that is to say, men who take postgraduate courses, that they would at the end of the post graduate course be in a position to take on work which would be more amply remunerated, I am sure we would have no lack of men ready to go into the work.

I listened with much interest to Dr. Cumming's paper, and I noted that in one point at least, in fact in every point but one, he and I are in absolute accord. The one exception is a point on which there is more likelihood to be some difference of opinion than any other. Dr. Cumming stated that in his opinion there will be only one post graduate college to begin with. We have in Canada some 7 or 8 agricultural colleges, and of course there is naturally more or less rivalry among these institutions. They are all, with one exception, Provincial Institutions. Now, Dr. Cummings stated in his paper that the work in a post graduate course should be supported by the Provinces and by the Federal Government, and supported more or less by donations or subscriptions of one kind and another from private sources. I quite agree with him on all these matters but it seems to me that any such co-operation of the Federal Government with one Province would be likely to lead to jealousy on the part of the other Provinces and to more or less rivalry. We should really attempt to pick some institution that is not Provincial in its allegiance or in its relation, and there organize such a course as would be very thorough and very complete and very well supported financially.

I would like to see a complete and comprehensive system of post graduate work at one institution in Canada so as to insure an opportunity for those who are in-

terested in the different lines that may be taken up to get that education and training at a minimum of cost and a maximum of efficiency.

There are a great many different lines of work for men who have genius that will give them a place in Canadian agriculture. Let me name a few of them: Live stock; that is a subject that is susceptible to subdivision into many headings, and there would be 25 or 30 subdivisions right there. Next, Horticulture, that also is susceptible to subdivision into many headings, and would almost rank with live stock. Then there is farm management, and so on.

In all these lines we have needed men during the last two months, and we have been unable to find them, and all the Provincial institutions and organizations having to do with agricultural progress are having the same difficulty. Plant Pathologists at the present time seem to be very rare birds. We find that we cannot get them anywhere in Canada, and they are scarce in the United States. When we go to the United States for them, we have to meet the competition of higher salaries than are being paid by the institutions here. There is a demand for experts in bee-keeping, tobacco growing, flax, flax mill operation, traction machinery, marketing, agricultural transportation and farm hygiene. I could give you lists almost without end. Anyone of these subjects demands a man who will give his time to it, and it will take several years to fit him to carry on investigational work. As an initial step in this work, it is absolutely necessary that the student should have a first class high school and college education, and at least Honor Matriculation, which is equivalent to six years in our Ontario High Schools. That is the

very minimum with which a man should start, and I agree with Dr. Macallum that it would be advisable for a man to have the degree of B.A. if he is going to carry on research work. He should have that degree to begin with. There is no reason why a certain amount of work that covers the B.S.A. degree should not be included in the B.A. degree; there is no reason why a man who has taken his B.A. degree should not be granted a certain minimum in the B.S.A. course. I think that is done in some of the agricultural colleges at the present time. I think it would be exceedingly unwise if we did not have this matter thrashed out here to-night.

DR. F. C. HARRISON: There is no subject in which I am more intensely interested than this one of graduate work in agriculture. I have listened with interest to the discussion that has taken place to-night, and to the very clear paper of Dr. Thompson and to Dr. Cumming's suggestions and Dr. Macallum's statements, and I agree with all that has been said, with a few minor exceptions.

With reference to the training of men going into research work, I am fully seized of the importance of having some preliminary training. I do not know, however, whether I can wholly subscribe at the present time to the assertion that has been made that the B.A. degree should be the first essential. There are B.A. degrees which deal with subjects which are very classical and take up higher Mathematics, and whilst I believe that a certain amount of training in Classics and Mathematics is essential for good research work, I do not think that at the present time such a training is altogether essential as a prerequisite for research work. It further puts on the time in which we can turn out men.

Again, I should be afraid that if a man embarks on an Arts course, he might be so diverted as to lose the practical bearing of many subjects that he might be asked to take up. It is hard to make any dividing line between pure science and applied science because often discoveries in pure science are of the utmost importance in applied science. You might get men of this training to do excellent work, but I think that it is well in the initial stages, particularly if they have not had any previous acquaintance with agriculture, to have some general knowledge of the subject, otherwise they might lose something of the viewpoint and practical bearing of the subject. I certainly believe in thorough preliminary training, and in certain lines of work, training in Languages and Mathematics is essential. A great deal of research work in Physics requires deep mathematical study, and Mathematics are required in Chemistry, Physics, and Bacteriology, and it is a subject to which we do not as agriculturists, give a great deal of time or thought. As far as possible, it would be well to work up to these things gradually and do what we can to fill the immediate wants of our colleges and experimental stations with what facilities we have.

Specialization has reached very remarkable proportions. We used to have a professor of Natural History who lectured on Geology and on Biological subjects including Botany, Zoology and Entomology. Then we got them subdivided, and now we have Entomology and all the other subjects so sub-divided that I think specialization is dwarfing the men, and they are becoming too narrow in their outlook.

I had an opportunity sometime since of talking to a number of men who have achieved promi-

nence in research work in the United States and who had gone to the United States Department of Agriculture by reason of the opportunity given them there of pursuing one research problem. The free hand given them was very much appreciated by these men, but after a time many of them began to feel they were becoming too narrow, and when opportunity came they again went back to the colleges and engaged in teaching. I think a certain amount of teaching work is rather a good tonic. It helps a man to rub against minds with new ideas, motives and aspects, and gives a change of occupation which I think is extremely healthy. If I were only engaged in research work, I should welcome a certain amount of teaching.

Dr Grisdale has given a list of subjects for specialisation which is alarmingly long. If we have to provide experts in all these lines, the Federal resources would be somewhat inadequate. I think a beginning should be made in those lines of work which call for the greatest number of men. I hope that the Dominion Department will be as helpful as possible in providing facilities. There is considerable jealousy in the Provinces in educational matters. Any new departure of the Dominion along educational lines is very apt to be strongly condemned by the Provinces. That is one difficulty that has to be overcome. The Dominion Department of Agriculture has taken men provincially educated and trained and has only indirectly contributed to that educational work. On the other hand, the Federal Department is the largest employer of research men, and it seems only right that they should help out the colleges.

Dr. Macallum's committees should be used and they will be helpful in awarding scholarships

and inducing men to go on with graduate work who perhaps have exceeded their somewhat limited resources in preparing for their Bachelor's degree.

We are trying to do something to turn out men with better qualifications with regard to their Bachelor's degree, and also with higher qualifications. We have already had a number of men who have taken the Master's degree. We have an opportunity given by McGill University to take the Master's Degree in the Science of Agriculture, and also going forward to the higher degree of Ph.D. provided of course certain requisite as to majors and minors and languages are taken. We have a number of men who are actually registered for the Doctor's degree at the present time. Our resources at Macdonald College are limited. We have not a rich provincial fund to draw on. Our endowment is largely private, but as far as our resources allow we are doing as much as we can to help out this very considerable shortage of specialists.

For the last three or four years we have not had the same number of men to graduate. Instead of graduating 150, only 30 or 40 have been prepared. Last year we had none, and this year 15. The Colleges have been called upon recently to help out in the Soldier's Civil Re-Establishment Work and this organization has taken a large number of graduates, and that has diminished the small existing supply. For these reasons you can see that it will take several years before the catching up process has been accomplished, but I think we should endeavor to turn out men who are much better trained fundamentally, scientifically, culturally than any that have been going through our colleges previously.

This meeting has been a great inspiration on account of the in-

sistent demand for better trained graduates and more post-graduate work. In speaking for Macdonald College, I can assure this Convention that we shall do our utmost to give the best possible training to all prospective graduate students.

PRINCIPAL RENOLDS: It has been stated more than once during the course of this discussion that the agricultural colleges have not taken a large part in training men for research. That of course is undoubtedly true, and in passing I should like to remind you that such a deplorable fact is not entirely or even chiefly the consequence of any lack of appreciation of the agricultural colleges of the need for research men. I would like to remind you that the problem of teaching at agricultural colleges has absorbed the energies of the men and absorbed the available funds, and, however much we may have desired, as we have desired, to strengthen our research departments, we have found it well nigh impossible to do this because of the fact that any extensions we have been able to secure in the direction of finances, has necessarily been expended in extending our teaching departments.

You know of course that the combination of teaching and research is strictly limited. While I believe the teachers should be research workers to as large a degree as possible, yet in agricultural colleges, there is a problem, during the winter session of teaching, and there is a problem during the summer term of extension and the preparation of bulletins and conducting correspondence and attending meetings, and these problems have so taken the attention and energies of our men that even those inclined to research have not been able to conduct them.

As far as training for research

is concerned, whether it should be in academic institutions or technical institutions, I am not quite sure. Being myself a graduate of an academic institution, I might be supposed to favor the B. A. course, and while one might not see at first glance the relation between practical training and research, I do believe there is close connection. If the objection mentioned by Dr. Harrison were not so real, namely the objection of time, then I would say perhaps a little training would be an excellent preparation for a man going in for research, because it is not only an exertion of ideas and accuracy of thought and expression, but there is also the development of imagination which a research worker requires for the highest success. Nevertheless the advantage of training in agricultural colleges is that he becomes acquainted with the problem.

As to the type of institution that should be recommended for research work, I am not clear as to the practical possibilities. Doubtless, ideally, one central institution would be the thing, yet we must not forget that local ambition would probably interfere as to the establishment of one central institution. I believe Dr. Macalium would agree with me that not only the agricultural colleges throughout Canada but the universities also would court for themselves the establishment of research and post-graduate departments. I believe the universities of Canada have definitely expressed their position with regard to the establishment of a central research school. While that opposition may be overcome, and while it may be decided that one central school is the best to meet the needs, yet the opposition is undoubtedly a factor which we must take into account. We must not forget that the universities and the colleges, which are attached to it, would be benefit-

ed by a research department. The presence in a college of a research department undoubtedly lends tone, character and elevation to the teaching that is done there, and for that reason I fancy there is a very real and indispensable desire on the part of all universities and colleges to establish sooner or later, post-graduate courses. I may say from my own experience that I have found it difficult to convince practical men and politicians with whom we have to deal and from whom we draw our resources, of the necessity of research work of any kind. For example, for three years I have been attempting to secure for our institution a 'Plant Pathologist, but not until now have I been able to secure an appropriation for that purpose. I believe a Plant Pathologist is now on the job in Manitoba. We have attempted to get research work going in a sort of subsidiary and secondary way as a department of our teaching, but to maintain in an institution where teaching is so insistent, separate men for research will be difficult until we can convince the public at large of the necessity of that kind of work.

DEAN HOWES: I have not very much to contribute in addition to what has already been given. I am glad of the opportunity of saying "Yea and Amen" to what has been said before. I take it, Sir, that there has been no intention to criticize the work of the colleges in the past. I did not gather that from the discussion. As mentioned by the Deputy Minister last night, we are very young yet, and I think considering our years and time and opportunity, possibly our colleges have done fairly well. At the same time when we take account of ourselves and realize wherein we are short and wherein we may correct our deficiencies, I take it that it is the sense of the

meeting that there is a necessity for this post-graduate work. I do not suppose there is any difference of opinion in that regard, but I can see at once there will be a difference of opinion as to the means in which that shall be placed in operation, and that is the line which I think perhaps the discussion should follow.

As the head of a young institution just beginning, I feel that I can only register my approbation of the movement. Some of you know already that our institution up to the present time has been conducted on three years' work following two years' work at the Schools of Agriculture. We have been instructed by our Senate to put on a four years' course, with the same number of months as put in by the other Faculties of the University. That is a milestone in our career. At the same time, we have been asked and have drawn up a course and combined our courses of Arts and Agriculture. The very specific reason for that was the preparation and encouragement of young men to go on with this work that we have been discussing tonight, the first two years being almost altogether arts, the next two years a combination, and the last two years practical agriculture with a commensurate amount of training. We will have two degrees, arts and agriculture. We think that will be an incentive to young men in our Province to avail themselves of the combined course. We have men from our Institution already who have gone to the United States for post-graduate work. I know of one now who would like to get into some Canadian institution, and we will have men all the time who will be looking for that sort of work, and if some central institution has already taken the lead others will follow, but we will have to take advantage of that for the time being.

NOTE:—At this stage of the discussion a committee was named to give the question of graduate study further consideration and to submit a report of their decisions. The committee was composed of Dr. F. C. Harrison (chairman), President J. B. Reynolds, Dean E. A. Howes, President L. S. Klinek, Dr. J. M. Swaine and Mr. H. S. Arkell. The report of that Committee follows:

Report of Committee on Graduate Study.

DR. HARRISON: Your committee begs to report:

1. That the necessity for graduate work in agriculture is imperative at the present time, both for preparing teachers in all agricultural subjects and for training men qualified to undertake research work.

2. That graduate courses be arranged for at the earliest possible moment in:

1. Animal Husbandry;
2. Agronomy;
3. Horticulture;
4. Poultry;
5. Plant Pathology;
6. Entomology;
7. Chemistry;
8. Physics;
9. Bacteriology;
10. Agricultural Engineering;
11. Rural Economics.

3. That in undertaking graduate work, it must be clearly understood that such work must be very carefully planned, adequately staffed and proper accommodation and equipment for the advanced character of the work, arranged for.

4. That all colleges be invited to co-operate in issuing an announcement of the graduate courses they are prepared to offer, as a guide to prospective students.

5. That this Society appoint a committee to advise with regard to the undertaking of graduate work at the various colleges, the

standardization and other necessary details of graduate work in agriculture.

6. That the Dominion Department of Agriculture be invited to enter into the fullest co-operation with the colleges, and to place, as far as circumstances permit, their corps of experts and other facil-

ities at the disposal of institutions offering graduate work.

7. That the facilities as regards scholarships offered by the Committee of Scientific and Industrial Research be taken the fullest advantage of, and that the colleges be requested to provide further scholarships for graduate work.

THE RELATION OF THE AGRICULTURAL COLLEGE TO THE FARMERS' MOVEMENT.

J. W. CROW, O.A.C., Guelph.

The Farmers' Movement is a broad humanitarian movement, only incidentally political in character, being primarily moral and social and secondarily economic in nature.

The agricultural college originated in the farmers' movement and has itself contributed very materially to the present situation. It seems, however, that the agricultural college is not providing at present the leadership which is ex-

pected and it therefore becomes proper to enquire into the situation and to bring about if possible a more satisfactory condition of affairs. It is because I feel so keenly the importance of the position occupied by the agricultural college that I appreciate the opportunity of hearing the matter discussed by this gathering of men whose activities are so closely link-

ed up with the future of agriculture in all its phases.

I am convinced that the agricultural college stands at the focal point of agricultural development and that it requires to be re-established in the public mind as the focal point likewise of our agricultural organization. In Canada at the present time we are formulating plans which will profoundly affect the future of agricultural research, experimentation and extension and through them necessarily the solution of our present agricultural problems. As already intimated, and as I am sure we all realize very fully, the agricultural college must provide competent leadership. In this respect we look necessarily to the men trained in the institution and graduated from it as representing the best we have to offer in the way of training.

It seems to me only a very brief inquiry is necessary in order to discover the chief function of the agricultural college in relation to this problem. Dr. Robertson, in his thoughtful address this morning, stated that the average farmer needs "skill in thinking" in order that he may be able "to make out of the acquisition of knowledge, intelligence." It becomes obvious at once that the men who make the most important contributions to



pected and it therefore becomes proper to enquire into the situation and to bring about if possible a more satisfactory condition of affairs. It is because I feel so keenly the importance of the position occupied by the agricultural college that I appreciate the opportunity of hearing the matter discussed by this gathering of men whose activities are so closely link-

agricultural advancement are those who are able to think accurately, to reason closely and to deduce from available knowledge the best rules for guidance. In this sense it is perhaps not wide of the mark to say that the greatest contribution the agricultural college can make to the farmers' movement is to train young men to think and to think straight. It is obviously not possible for the student to absorb all knowledge but it is possible for him to learn the right method of approach to his subject matter. The mark of an educated man is his attitude towards knowledge and especially his attitude toward new knowledge.

It will be pointed out of course that the matter of teaching a boy to think is a problem which concerns our entire school system, with which statement of course we fully agree. This does not mean, however, that the agricultural college is thereby absolved from any of its responsibility in this direction; rather is its duty in this regard emphasized and made all the more important. We are accustomed to speak of agricultural education as though there were several kinds of education of which the agricultural is one. We sometimes forget that education is properly a development of the mental faculties and that the psychology of thinking is "the same in all cases" whether the subject matter be astronomy, theology or agriculture. There is only one kind of educative process and therefore only one kind of true education. A student may acquire an education in botany or in mycology, but the education he receives is not, therefore, to be spoken of as mycological or botanical.

It will be stated of course that graduates from our agricultural colleges are expected to possess a broad foundation of knowledge but in my opinion we are over-em-

phazing the matter of breadth. I believe that the situation in Canadian agricultural colleges calls for a considerably greater degree of specialization as a remedy for the present overloading of curricula. Arguments against specialization are, it seems to me, fully answered when we have safeguarded the kind of thinking a student is required to do. Even if a man knows nothing but corn—if his thinking about corn is accurate and if he sees corn in all of its broad and intimate relations to human welfare he is not narrowly educated and certainly is not to be regarded as inferior in mental development.

The advocates of so-called "technical education" frequently fall into error in this regard. "Education" which goes no further than mere training in the technique of a craft may not be education at all in the true sense. An educational system which omits the cultural values is seriously deficient from the human standpoint. Ancient Rome and recent Germany were built on this plan and in the light of our understanding of democracy no further comments should be necessary.

If the agricultural college is to function properly as a training school for rural leadership it must be alive. To be alive it must be in closest touch with new information. It seems to me it would be very difficult for a teacher to keep up-to-date if he were dependent for his new information on sources outside of his institution. Conversely, it seems to me that the argument for developing research work within the agricultural college is incontrovertible. The quickest way to kill the agricultural colleges would be to take the functions of research and experimentation away from them. It is not necessary that teachers shall undertake research but it is highly important that research work shall

be done and that both student and teacher shall come in contact with the researcher to a sufficient extent to get his viewpoint. Research workers should not be expected to do very much teaching but they should do some and while teaching is itself a distinct line of work the teacher who is not at the same time a student of the difficult problems of his subject is intellectually dead and is not fit to stand before a class. The agricultural college must interpret to the agricultural community the scientific viewpoint and must show the farmer what science can do for him. In my judgment the important contributions still to be made in the cause of agriculture will come from the trained scientist through close study and careful analysis or in other words, through research. We are accustomed to speak of science and practice as though it is possible for them to disagree in certain instances. It might be pointed out that **the best practice, when all conditions are taken into account, is scientific, and science, when applied in the light of existing conditions, becomes likewise the best practice.** The history of agricultural science shows that agriculture is only recently out of the primitive stages. Great changes and improvements are ahead. In my judgment science holds the key to advancement.

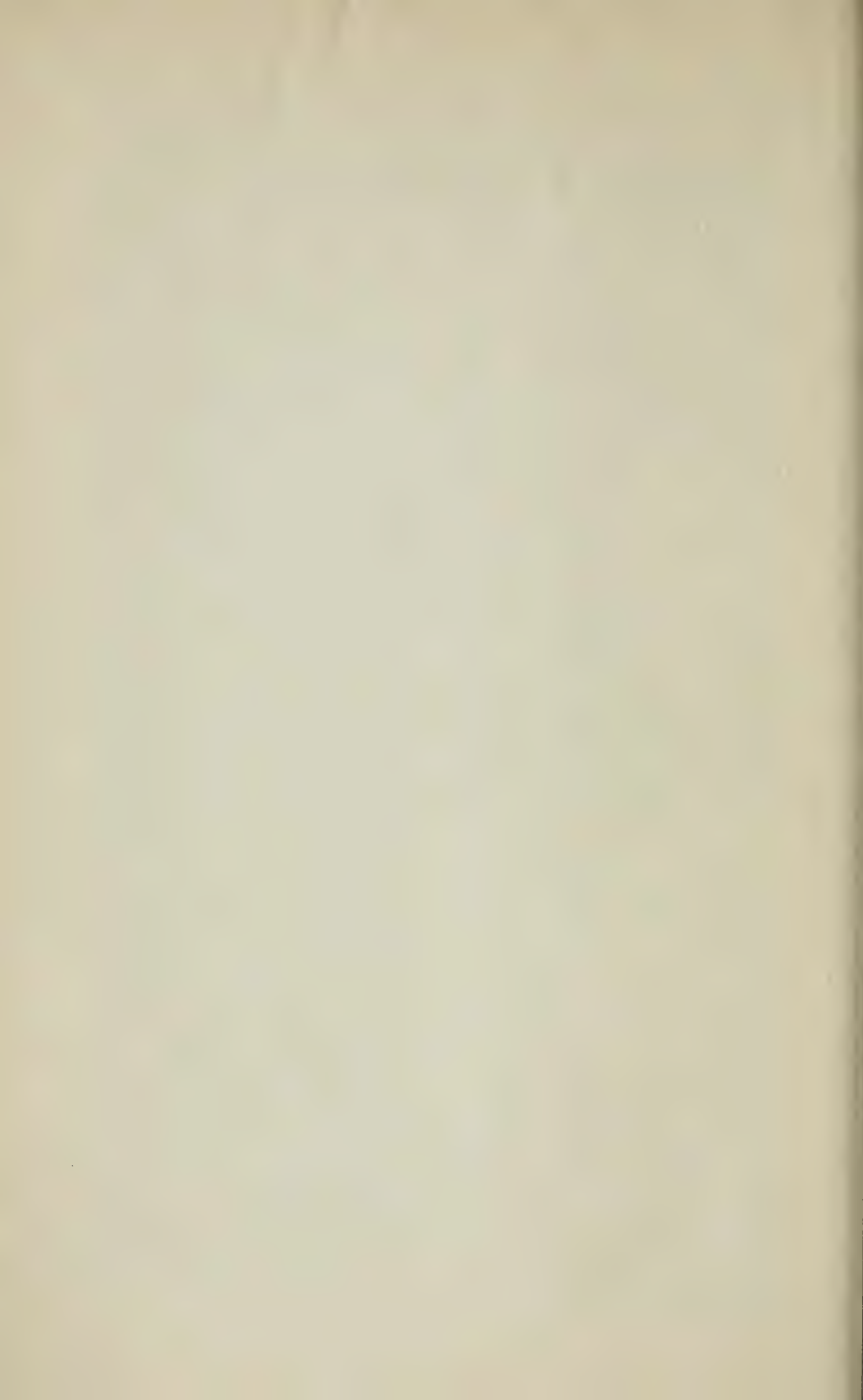
The agricultural college should be the centre also of activities related to the breeding and improvement of plants and animals. The viewpoint of the breeder is fundamental to agricultural practice and the young men trained in our colleges are entitled to the best available information on the subject. It would certainly not be possible for them to become informed unless actual work in breeding and scientific study of the same are conducted within the institution.

Another aspect of this matter is of even greater importance. The

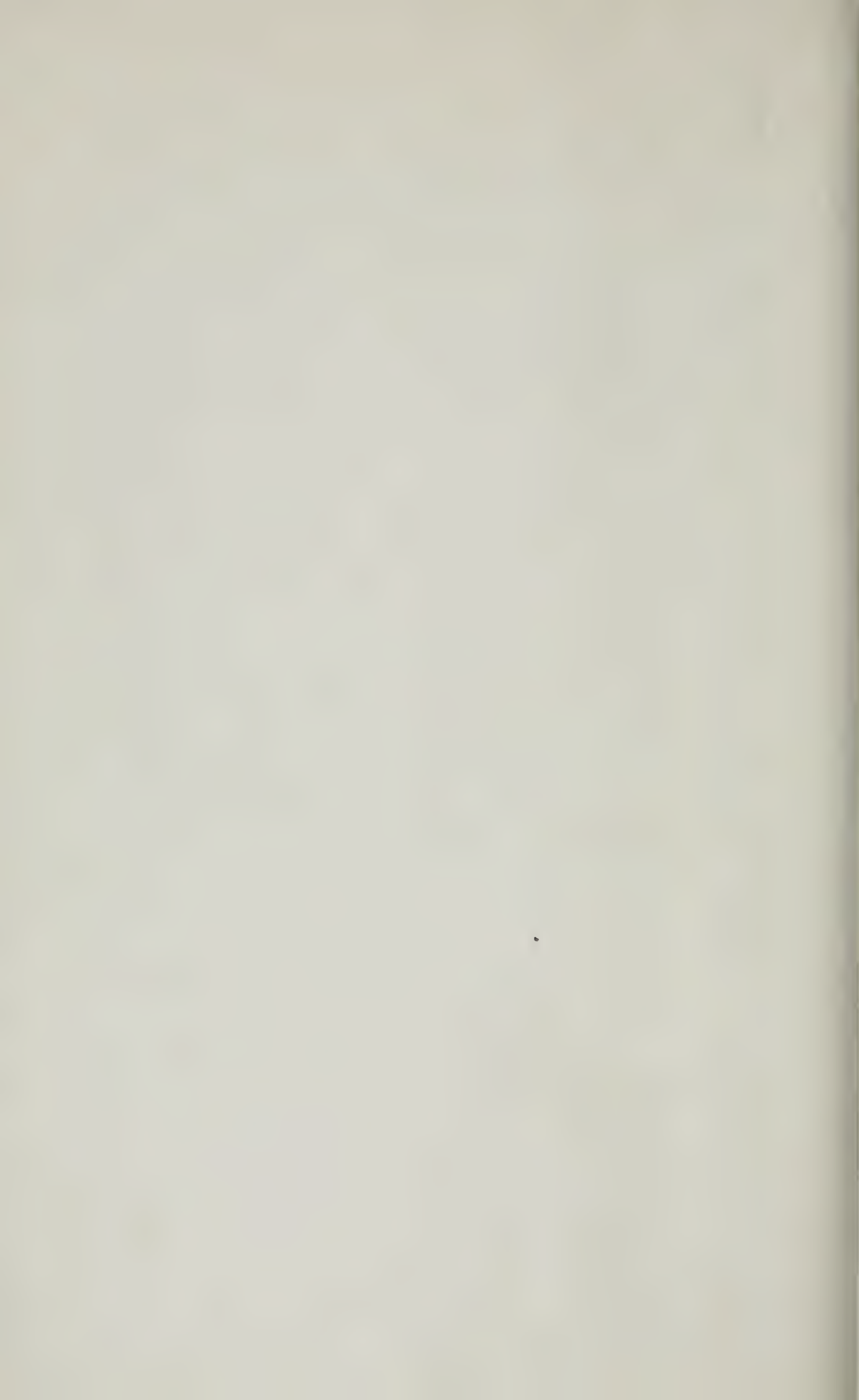
viewpoint of the breeder is of great intellectual interest and is in fact, recognized by the modern biologist as furnishing the key to the understanding of Nature. There is no more fascinating study than the improvement of plants and animals by breeding and furthermore no line of thought sheds more light on fundamental human problems. The principles of breeding are identical with the principles of growth and development as exemplified throughout the organic world and the methods of breeding in common daily use by the farmer are likewise those which nature uses with all living beings. The farmer, therefore, ought of all men to possess the clearest and most intelligent view of the world he lives in. He of all men ought most to be able to appreciate his environment and derive enjoyment therefrom. I believe the chief reason why young people leave the country is through lack of intellectual interest and I can think of nothing more stimulating and enlightening than the principle of growth and development as it is daily exemplified in farm practice and as it is so abundantly evidenced in the world of plants and animals among which the farmer lives.

I could wish for a young farmer nothing better or greater than an education which will stimulate his sympathetic interest in the farm and in country life and which will teach him to think accurately and to good advantage upon matters of interest connected therewith.

An education, too, which will relate his daily practice to his philosophy of life and which will show him that the possibility of improvement is fundamentally the principle which underlies all organic development. I should like him to realize too that the same principle lies at the base of all educational effort and that without it even his theology is hopeless.











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